A Database Publication

electron user

Vol. 4 No. 12 September 1987 £1

The anatomy of an arcade game

CRAZEE RIDER

UTILITIES
Save screens to disc with Snapshot, pack more programs on disc with Compacter

ARCADES
Hints, tips, maps for Ravenskull

GAMES
Dig for treasure with Mr Miner and make a million on our Lemonade Stall

NOW AVAILABLE FOR THE ACORN ELECTRON

STRYKERS RUN

Commander Stryker under fire in the city

Battling in the air

An action close-up

Enemy equipment (Enhanced BBC Master version)

A camouflaged Battle fortress (Enhanced BBC Master version)

STRYKER'S RUN for the BBC Micro B, B+, Master, Master Compact, and Acorn Electron

Stryker's Run features probably the best graphics ever seen on the BBC Micro or Acorn Electron; the action is intense and the animation is superlative.

The battlefield graphics include cities, edifices, wrecked buildings, trees, gravestones, bridges, despatch-posts, military bases, helicopters and jet ships, with hills and mountains in the background. The Master-enhanced version also includes statues, watch-towers, a neglected cafe, a deserted cinema, aircraft hangars, aeroplanes, trucks and tanks.

For many years, a war has ensued between the Allied Nations and the Volgans. The battle was reaching a stalemate position, but recently the Allies through good intelligence work and some luck have managed to obtain the plans of the Volgan's next offensive. If the Allied Forces can capitalise on these plans they can end the impasse and the war. You play the role of Commander John Stryker commissioned to take this top-secret information to the Allies' HQ.

Your character in the game can jump, run, duck, fire his laser pistol and throw grenades. He can also board aircraft and fly them, making use of their more powerful weaponry.

Your opponents, the Volgans, have a variety of weapons at their disposal comprising rifles, pistols, grenades, machine-guns, mortars, mines, helicopter gunships, rocket launchers and SAM missiles.

Stryker's Run is one of our most successful releases ever. It has topped the BBC Micro software charts for six weeks and received several glowing reviews: *"The graphics are stunning . . . This should be in every collection"* enthused A & B Computing.

Enhanced Version for the BBC Master Series

Stryker's Run is the first release to include a specially enhanced version for the BBC Master making use of its 128K of RAM.

An extra 40K of detailed graphics are provided together with additional game features and atmospheric music.

BBC Micro Cassette	£9.95	BBC Micro 5¼" Disc	£11.95
BBC Master Compact 3½" Disc	£14.95	Acorn Electron Cassette	£9.95

The screen pictures show the BBC Micro version of the game.
The graphics of other versions may vary.

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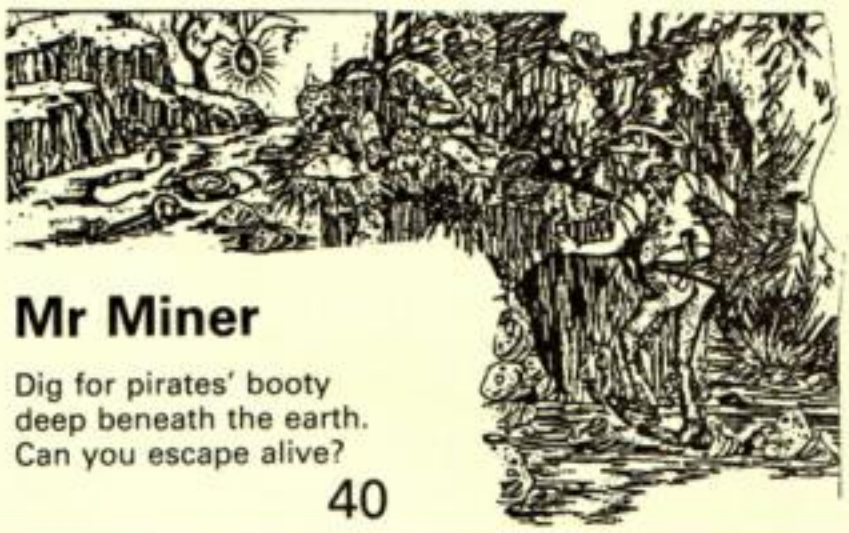

Mr Miner

Dig for pirates' booty deep beneath the earth. Can you escape alive?

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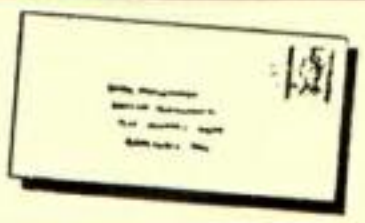

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The pages you write yourselves. A selection from the hundreds of letters in our mailbag.

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AD84

electron user NEWS

Courses boost job prospects

UNEMPLOYED members of the Church of Jesus Christ of Latter Day Saints, better known as the Mormons, are learning new skills with the help of an Electron.

Part of the Mormon belief is that individuals should be self-sufficient and be able to provide for their families.

However, no one is free from the threat of redundancy, so members of the Birkenhead Chapel on Merseyside are spending their free evenings learning about word processing and spreadsheets in order to increase their job prospects.

The courses, which are free of charge, are open to non-members as well.

An Electron with a Plus 1 expansion box is being used along with View, Viewsheet and a TEC printer.

Course members are taken through each stage of learning at their own pace.

At first some people were a little apprehensive about using a computer of any kind but now it comes as second nature to them.

As one member put it: "Until now the most complicated piece of equipment that I had ever used was a TV remote control unit. I was a bit scared at first but the Electron is really easy to use".

Merseyside has a large unemployment problem and the bishop of the Birkenhead Chapel, Norman Jones, hopes that the courses on the Electron will help some of his members back into work.

Electron gets that big band sound

AN integrated music system will soon be available for the Electron, offering the little machine a greater degree of sophistication in yet another field.

Advanced Computer Products and Hybrid are getting together to provide a package which will offer a digital keyboard synthesiser, eight-track recorder and a composition tool among other things.

John Huddleston of ACP explained that Hybrid's Music 5000 has had some conversion work done on the software so that it would go on the Electron through his company's AP5 – the special interface which opens up the computer to the outside world in a way of which the original designers would never have dreamed.

John Huddleston

Music 5000 was designed to provide general musical enjoyment, exploration and education on the BBC Micro.

John Huddlestone says its features will all now work on the Electron.

These include the 96-sound synthesiser plus the opportunity to define more; a music production studio with pitched instruments, percussion and sound effects; and a digital recorder with overdubbing, pattern sequencing, live mixing, editing and printout.

"When the set up was demonstrated at a recent show afficionados were amazed that it actually worked on the Electron", said Huddleston.

The top show is back

THE show that every Electron enthusiast looks forward to is set to return to the Royal Horticultural Hall, Westminster, London.

Pre-Christmas bargains and exciting new products will fill well in excess of 100 stands at the Electron & BBC Micro User Show from November 13 to 15.

All the major producers of software and hardware for the Electron will be there again, their enthusiasm fuelled by the tremendous success of the spring show at the same venue.

Since that event many more enhancements to the increasingly sophisticated Electron have been developed by various suppliers.

These will all be on view, along with a wealth of entertainment and serious software – much of it on sale at bargain prices.

"This is a perfect opportunity for Electron users to bring themselves up to date regarding recent developments – and fill their Christmas stockings at the same time", said Derek Meakin, head of Database Exhibitions.

NEW SLANT ON RACING

THE first motorbike race game for the Electron with cornering facilities has been released by Superior Software (0532 459453).

Crazee Rider, which features impressive graphics, is controlled from either the keyboard or joystick.

The player can race on a total of seven world-famous tracks. Once 21 races are over a congratulatory message is displayed which is also the answer to a competition being run by Superior Software.

The prize is an MZ Simpson sports moped worth over £500,

Price £14.95 on disc and £9.95 on cassette.

Games go on disc

FOLLOWING demands from *Electron User* readers, Superior Software has announced that it is to start producing Electron games on 5.25in discs.

It would appear to be a very good move as the Plus 3 drive for the Electron is in short supply and many owners are buying Advanced Computer Products Plus 4 interface that allows them to use 5.25in discs.

"We have been getting an increasing demand from owners of the Electron with 5.25in disc drives to release our products on that format", said Steve Botterill, general manager of Superior (0532 459453).

"It continues to be a very popular computer which accounts for 40 per cent of our business".

The first game to appear will be Palace of Magic, an arcade adventure that covers 100 rooms.

Having been turned into a dwarf by an evil wizard the player has to find the magic room where he can regain his normal height.

While travelling around the palace, obstacles and dangers like the evil princess and the guardian of the gods have to be avoided.

Palace of Magic is due for release in September and is expected to retail for £11.95.

Ex-offenders find new future through Electrons

ELECTRONS are helping homeless ex-offenders to turn over a new leaf and opening up new career possibilities for them.

Trevor Dunkerley, who is warden of the Langley House Trust in Reading, became interested in computers back in 1984 when he found himself being upstaged by his nine-year-old son.

To try and redress the balance he bought himself an Electron and went to his son's teacher to learn more about the subject.

After a while he realised that computers could be of great value to some of his residents who were trying to come to terms with life outside prison.

One of the main stumbling blocks when trying to overcome the problem of unemployment was that the traditional manufacturing industries that usually provided jobs for Langley House residents had been swept away.

But there was another obstacle as Trevor pointed out: "The new industries were mostly hi-tech based, offering very little opportunities to the men in our care.

"As a result they had a lot of time on their hands, time which could be occupied creatively through the use of a computer".

Currently the Trust has three Electrons in full time use by the residents.

Education has proved to be one of the key fields the machines have been used for.

One young man felt so threatened by teachers that he refused to learn, but by using the Electron at his own pace he has progressed rapidly. Another has benefited from the computer in a way that was previously unimagined.

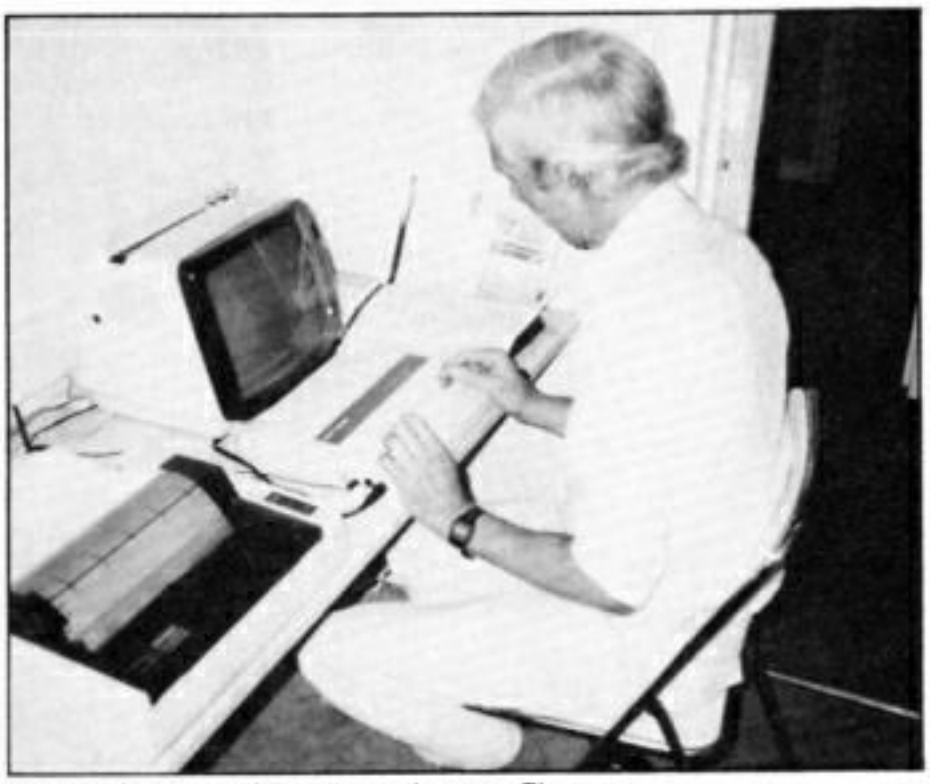
"Brian had been a very active young man before he had a severe heart attack and found great difficulty in coming to terms with his disability", said Trevor.

"He started to learn Basic which kept his mind active. The therapy which the Electron brought to him in the early days of his illness has allowed an almost complete recovery".

Apart from the educational and theraputic values of the machines, the men are also being taught about word processing, communications and programming.

"All of these skills will help when they come to finding jobs in the future". said Trevor.

Because the Langley House Trust is a registered charity, funds are somewhat limited but there are plans to increase the number of Electrons as soon as possible.



Langley House resident at work on an Electron

'Messing about' to good effect

THE search is well underway to locate the UK's oldest Electron enthusiast. Latest to throw his hat into the ring for the title is Bill Trevelyan who became a computer buff on his 70th birthday.

Looking for something to occupy his mind after retiring, former micro-biological chemist Bill subscribed to an introductory computing course he'd seen advertised on TV.

His interest might have ended there – but in 1983 his son bought a BBC Micro and recommended that Bill do the same.

However, the wily Welshman – clued up by his correspondence course – decided an Electron at half the price was a better buy.

It was a decision he's never regretted. "I discovered the most magnificent puzzle machine anyone could want, with just the right level of complication for an old plodder like me", said Bill.

A little later he made an even more important discovery – *Electron User*. "I have a great admiration for the magazine, I learnt all my elementary work from it", he said.

"I've got every issue from No 1 onwards and I love the quite delightful sense of enjoyment that exudes from each issue – it strikes a perfect balance between useful information and entertainment".

In reality he is the author of half a dozen highly informative and entertaining articles on games programming in Basic that have appeared in *Electron User*.

But Bill still maintains: "I'm not technically very good, I just know how to tell people how to avoid the mistakes ordinary duffers like myself make".

Now the owner of two Electrons, the second bought when he hammered the keyboard of the first into submission, Bill says his hobby is still as stimulating and entertaining as ever.

"At my age I consider I'm computing in injury time", he joked, "but hopefully I'm good for a few more years".

Footnote: If there is any other reader out there – be it a grandma or grandad – whose advanced years make them eligible for the title, *Electron User* would like to hear from them.

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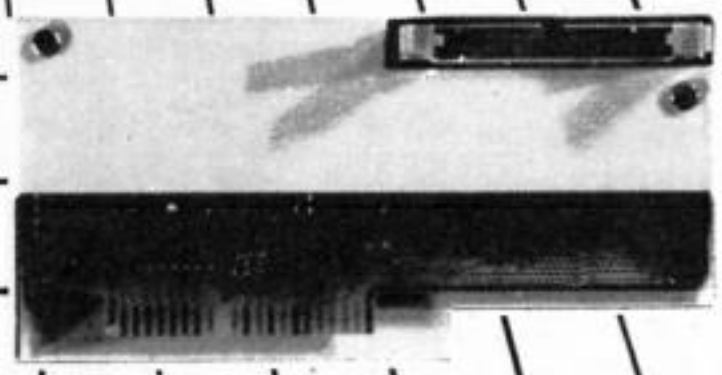

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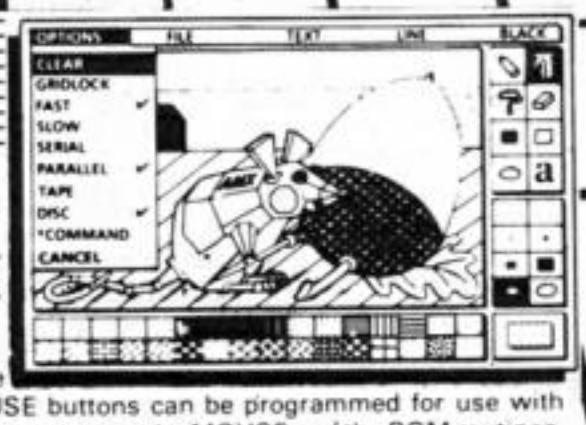

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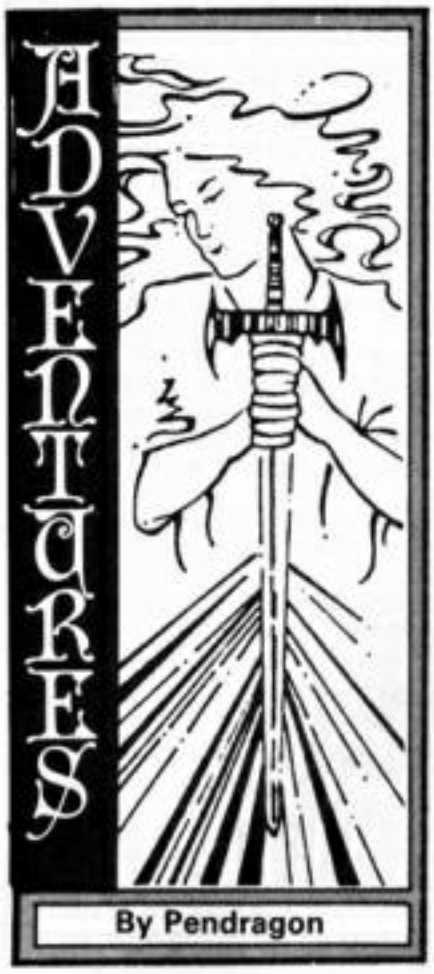


By Pendragon

Overcoming dead ends — and Dead Enders

A NUMBER of new releases have landed on my desk during the past month and perhaps the pick of the bunch is a soap opera spoof by Riverdale Software called Suds.

You can journey through the sets of Emeroyd Farm, Abdication Street and The Cross-eyes Motel before savouring the atmosphere of the Dead Enders of London.

Although I discovered one or two minor bugs, this adventure is a delightful jaunt which will provide many hours of amusement – especially for those with a sick sense of humour.

Compared with the much vaunted Mosaic release, The Archers, Suds deals with the medium of soaps much more successfully.

The new Elk Adventure Club release, Starship Quest, follows in the tradition of Magnetic Moon and is recommended, especially for more experienced adventurers.

Tynesoft's Oxbridge is a bit of an enigma as it is presented in a simplistic manner, while containing some devious problems, including a clever variation on the age-old sliding block puzzle. I'm reserving judgement about this one.

I must tell you of a fantastic rerelease of the Magus epic, Village of Lost Souls. Now on the Robico label, it is essential for any self-respecting adventurer.

I have spent many hours rediscovering this medieval masterpiece and can provide help for those who are lost in the realm of chaos.

Word is that Martin Moore is currently coding a sequel to Village of Lost Souls and I await this with anticipation.

The quality of recent releases by a number of software houses must make many adventurers envious of Electron users.

You will notice that I have begun serialising location guides to Savage Island 1, which, judging by my mail, must be the most complex and difficult adventure available for the Electron.

I hope these guides will help many who may have given up in despair.

Until wands don't need waving, happy adventuring.

Readers' Hall of Fame

Rick Hanson (continued from last month) **— *Robert Hales***

In the lush pasture, go SW and WAVE SEAT COVER, then DODGE BULL. Go W, N, IN, and GET TROWEL, OUT, NORTH, WEST, DIG WITH TROWEL in the manure heap. Incidentally, to get rid of the mouse, DROP PORK PIE.

From the manure, go NW, NE, E, E, OPEN IN DOOR, IN, E, N, GET SKIS, S, W, OUT, W, W, NE. At the foot of the cliff TIE THE HOOK TO THE ROPE, THROW ROPE and CLIMB ROPE. Go N into the cave and read the markings. Make a note of what you find.

Go S, W, NW, N, NE, N to the ice shrine. Go E then WAX SKIS WITH POLISH and WEAR SKIS. Go D the hill, TAKE OFF SKIS, E, N, GET MATCH, S then MAKE BOMB.

As with the train, WAIT for a jeep. When you get the message, "There is the sound of a vehicle approaching," LIGHT BOMB, THROW BOMB. Go S to the jeep. EXAM CORPSE, GET UNIFORM and WEAR UNIFORM.

Get IN jeep and DRIVE JEEP. Keep driving until you reach the gates of the military establishment. When the guard asks for the password, type what you found on the wall of the cave.

Drive the jeep again, then go OUT, S, E, IN. To get through this maze, think about the description, SILENCE – NO SOUND.

Once through the maze, go D, D, W, W, W, N, GET SCREWDRIVER, S, E until you reach an exit down. Go D the ladder, then E, N, N, W and get the bullet.

More next month.

Location guide to Savage Island Part One

Location	Description	Objects	Exits	Result
1	Beach by ocean	Sand, stone head Impenetrable jungle	SOUTH EAST WEST DOWN GO HEAD	7 3 2 5 head
2	Beach by ocean Cliff visible	none	EAST	1
3	Beach by ocean	Trees and logs when hurricane hits	WEST CLIMB TREE	1 4
4	Top of tree	Coconuts	DOWN	3
5	Tidepool	Water, later a raft	SOUTH	1
6	Atoll	When cannonfire is heard, pirate ship appears. Raft	GO RAFT	Raft
7	Plain	Extinct volcano	NORTH GO VOLCANO	1 8
8	Rim of volcano	None	DOWN GO VOLCANO	7 9
9	In volcano	Lake, cave, bear	UP GO LAKE GO CAVE	9 13 10
10	In a cave	Fish bones, stone basin, opening, bear	EAST GO CREVICE GO OPENING	9 12 11

Enthar Seven (continued from last month) **— *The Boss***

Go SOUTH into the Teleport Chamber and PRESS S4. Sector four is self contained and will provide essential equipment to complete sector one and other parts of the adventure.

Avoid the camera to the east of the gate and follow the perimeter path WEST and NORTH round the complex. At the North West corner continue EAST until you reach a track which leads off to the NORTH.

Follow this track and explore every inch of the rubbish heap. If successful, you should now be equipped with a can of aerosol paint and a robot casing which must be worn.

Retrace your steps to the perimeter track and continue circumnavigating the fence to the EAST and SOUTH. When you reach the security camera, SPRAY PAINT to obscure surveillance.

Enter the gate and walk NORTH through the white sliding door and PUSH through the revolving door. At the junction go EAST and retrieve the pliers from the tool cupboard.

Now travel WEST along the corridor and NORTH through the lab, picking up the flask on the way. When you reach the anteroom wait and watch the movements of the securibot, which follow a regular pattern. You can then go safely and take the DECIBOX and TRANSLATOR without mishap. *More next month.*

The Lost Crystal (cont. from last month) **— *Robert Henderson***

Here's where it starts to get tough. You will soon be reacquainted with the miller, so give him your lamp and he will light it, and wander off.

You will have to move around a bit in the dark until you find him. He is usually near the bones of his previous assistants.

Take the lamp and lead him to the bag of flour by saying FOLLOW ME. Now tell him to STAY HERE. Explore the passages, roll the boulder and climb on top.

Go to the wishing well and throw in the coin – a whistle will then appear. Retrace your steps, but remember to roll the boulder back into place.

Go and get the miller and sack of flour, then search for the skeleton. When you find it blow the whistle, but remember to leave the bottle at another location or else it will shatter. Collect your bottle and, with the miller, go to the stone door.

Push the door and enter the cave. Take the key and get the miller to drop the sack of flour on the bogle's chair. You can now escape via the secret exit, although the miller is caught and killed.

Now go to Merlin's cave and eat the cheese sandwich. Open the wardrobe with the key and get the cloak, but don't wear it yet. Next, go to the troll's bridge and wear the cloak to escape detection. You have now completed part two of the adventure. *More next month.*

◀ From Page 11

Problems Solved

*I mentioned last month a letter from Louise Hand who asked for help with **Wheel of Fortune**.*

She has almost finished the adventure and has gathered a wealth of treasure, but is presented with the message: " You've got the right idea, but missed too much treasure".

It seems that Louise is not alone in this predicament.

The complete itinerary of treasure should read: Gold bar, pearl necklace, diamond brooch, key, watch, painting, medal, tray, bracelet, truncheon, gemstone, trinket, music box, sapphire, pendant, banknote, portrait, ore, purse, tiara, coronet, figurine, lucky charm and statuette.

To prevent the troll returning to his cave, you should also place the basket and snake at the entrance.

*G. Hawkins asks how to find the solicitor's office in **Philosopher's Quest**. You will need to map the maze west of the smooth corridor carefully and you should then have no difficulty in taking the will to the solicitor.*

While on the subject of Philosopher's Quest, Graham Thompson and I would like to discover what the M.E. stands for, regarding the M.E. passages.

*Mr B.G. Nicholson wants help with an old MP software game, **Woodland Terror**. I must admit that to answer this one, I had to dust off some ancient and rarely used maps.*

He has found the small room beyond the blank wall, but can go no further despite being armed with the wizard's hat and staff. According to my parchments you should say NEIRIF.

*In the **Ket Trilogy**, the crimson fish is a red herring and anything which the rat steals can be recovered after a bit of exploration.*

You must also distract the gremlin to finish part one of this adventure as you will never beat him in combat Emma, Daniel, Geoff and Richard.

*Meanwhile Ewan McPherson is struggling to get the laser in Superior's **Stranded**. I think you need to JUMP in order to TAKE LASER, Ewan.*

*Finally, Simon Lewis writes in frustration that he has scored maximum points in **Twin Kingdom Valley** and wants to know what he should do next.*

Besides having fun bashing all you may now meet, I can only suggest that you take the Secret of Life back to Watersmeet and look at it.

If you find that anticlimatic, just try playing Classic Adventure right to its conclusion.

Overture & Beginners

There can, perhaps, be nothing more infuriating in text adventuring than to reach a seeming impasse. Many a time have I struggled for hours with various strategies and reruns, and still found myself stymied.

Eventually, weary-eyed, I would make my way to bed and lie awake for hours trying to fathom out what I may have missed or what other ploy I could try.

Paradoxically, such frustration is one of the greatest joys of this genre of puzzle solving. We all have blind spots, though thankfully these do seem to decrease with experience.

One of the first adventures I ever tackled was the Scott Adams' Voodoo Castle. Despite it having only 27 locations I was stuck for hours with a plaque which I could not read.

At first it seemed the writing was too small, though I managed to remedy that with a magnifying piece of broken glass.

Then I discovered that the writing was luminescent and would have to be read in the dark with a light source at hand.

There certainly were a number of dark places in Voodoo Castle, but I could not find a lamp or torch.

Eventually after what seemed to be days of trying, I dusted an idol in the fireplace and it glowed – the idol that is. At last I could read the plaque, only to find that it told me something which I already knew.

Sometime later I was in an even deeper mire trying to operate a neanderthal elevator in Potter's Staff of Law.

In a temple with three floor levels, and a platform and pulley to move up and down, I was unable to transport artefacts between floors as I needed both hands to operate the lift.

Only after hours of experiment did I successfully solve a puzzle which is far too complex to explain without giving a blow-by-blow solution.

More recently, I was unable to pass a policeman in Larsoft's Nine Dancers. While equally, at a different location, I could not trip an alarm which was waiting to be rung.

My problem was that I could not see a connection between the policeman and the alarm, and my progress in the adventure had come to a halt. Apart from that, I had inadvertently sold the item I needed to solve this puzzle.

I gave up the adventure as a bad job, only to return to it with new vision some weeks later.

Disguising myself as a tramp and smashing a valuable urn on the pavement near the alarm I successfully distracted the policeman away from guarding the path into the second part of the adventure. I had to remember to hide my disguise after perpetrating this bluff.

Perhaps the moral from these experiences is: If at first you don't succeed, keep trying.

● *Next month I shall look at overcoming some devious dead ends.*

Hit for six

Program: Graham Gooch's Test Cricket
Price: £9.95 (cass) £11.95 (disc)
Supplier: Audiogenic, 12 Chiltern Enterprise Centre, Station Road, Theale, Berkshire, RG7 4AA.
Tel: 0734 303663

CRICKET is a tactical game of subtlety which makes it interesting to watch and difficult to play.

For the same reason, trying to simulate cricket on a computer accurately would appear to be almost impossible. Audiogenic has attempted this and produced Graham Gooch's Test Cricket.

You play one of three types of limited over games or a full two innings Test. The teams are England and Australia, but you can alter the names and the players, together with their batting and bowling averages.

You select from two squads of players and I think it would help if the lists included information as to whether they are batsmen, bowlers, wicketkeepers or all-rounders.

Once the teams have been selected you decide what type of match to play and whether you require a one or two-player game.

Next, decide on your skill level, and who your team's wicketkeeper and slip fielder will be. Be careful here, the first time I played I put Botham in the slips and found later, this prevented him from bowling.

If you win the toss you can bat first or put the opposing side in. Take my advice, if you get the choice, bat second.

Bowling takes a little practice, but it is possible to make some reasonable deliveries. On the other hand, I found batting extremely difficult, even on skill level one.

For some reason the boundary fielders drop catches nine times out of 10 when I'm bowling but never miss when I'm batting.

The colour scheme is predominantly green with white for the players' bodies and crease markings. The screen is extremely bright and it wasn't long before I swapped the colour monitor I normally use for a black and white portable television.

The view is from behind and slightly above the bowler. The graphics, while not anything to write home about, are adequate.

The sound is pretty awful. At the start of the bowler's run there is an annoying beep. The other sounds are the thwack of the ball hitting the bat or pads, the slightly different thwack when it catches the edge of the bat and a sound like bacon frying to represent applause.

Graham Gooch's Test Cricket is a fair attempt at a simulation, though it may have a limited appeal. Those who don't like or understand cricket may find the game boring, while the purist will probably think it "just isn't cricket!".

Desmond

Sound	6
Graphics	6
Playability	7
Value for money	7
Overall	7

On yer bike!

Product: Crazee Rider
Price: £9.95 (cass) £14.95 (disc)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

DON your crash helmet and zip up your leathers. You'll need nimble fingers, fast reactions and a kamikasi streak if you are to survive Crazee Rider, a superb motorcycle race game.

The screen display shows your bike, speedometer, race position indicator and view of the track. At the top is a bird's eye view of the race track – there are seven in all.

As the starting lights change to green 59 bikes fly past as you accelerate towards the first bend.

The micro cheats here as the computer controlled bikes accelerate to maximum speed instantly, whereas it'll take you at least half a mile.

Luckily, your racer has been tuned by the best mechanics in the business and they have managed to squeeze a few extra horses out of the engine. This means, flat out on the straight, chin on the handlebars you can easily overtake the fastest of the micro bikes and work your way up the field.

The back markers can be a problem as they have an annoying habit of getting in the way at the worst possible moment, usually in the middle of a bend.

These aren't easy to negotiate, but you can see what's coming up by looking at the plan view of the track at the top of the screen. Your position is shown as a large red dot.

After discovering you can't crash or go off the track, my first instinct was to simply hold the throttle wide open.

I soon discovered this wasn't the best tactic however and your speed drops rapidly as you near the edge of the track or ram the bike in front.

It soon becomes clear that it's best to follow the racing line through the bends. With one eye on your speedo and one finger on the brake, swing from outside the track to inside and slide back out again by snapping the throttle open as you exit the bend.

Although Crazee Rider is a fair simulation of a motorcycle race it's not intended to be accurate. It's more of a cross between an arcade game and a simulation. Points are gained by riding round the track and passing the opposition. You can also ride alongside the computer bikes and ram them off the track to gain bonus points.

Providing you finish in the first six you move on to race at the next track. It'll take a few laps to familiarise yourself with the layout, but unfortunately, you aren't awarded this luxury.

Crazee Rider is an exciting game – it's fast, challenging and there's plenty to keep you entertained.

Joanne Hutcheson

Sound	8
Graphics	8
Playability	10
Value for money	10
Overall	9

Dynamic duo

Product: Stryker's Run
Price: £9.95 (cass) £14.95 (disc)
Product: Codename Droid – Stryker's Run Part 2
Price: £9.95 (cass) £14.95 (disc)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

ELECTRON users have done it again – top software house Superior Software has been pressured into converting its top selling BBC game Stryker's Run to the Electron.

It has also converted its brand new, block-busting follow up Codename Droid – Stryker's Run Part 2.

Stryker's Run (part 1) is a commando style shoot-'em-up featuring some of the most outstanding graphic backgrounds seen on the the Electron.

You control Commander Stryker and your task is to guide him through enemy lines back to the Allies' headquarters to deliver top-secret information.

The game-play is straightforward – you can run left or right, jump and duck. As you reach the edge of the screen the next one flicks up after about a half a second.

Crossing the battlefield you'll pass beautifully drawn cities, wrecked buildings, graveyards, burnt tree stumps, hills and mountains. It's amazing how much is crammed into the game.

Initially, the only weapons you have are a pistol and a pocketful of grenades to fend off the enemy Volgan troops and helicopter gunships.

The troops can be despatched with either a bullet or grenade, but there's no defence against the helicopters' bombs – you run for your life.

As you progress through the screens you'll find a stubby, wedge shaped aeroplane. You can climb in the cockpit and zoom off. Then you can bomb the enemy troops and have a crack at shooting down the helicopters.

There's only a limited amount of fuel, however, and you soon float gently back to earth (that's if the rocket launchers don't blow you out of the sky first).

There aren't many sound effects and the animation is a bit flickery at times, but overall it's a good game and well worth the money.

Codename Droid, the follow-up to Stryker's Run, is a different game altogether, and it held my interest much longer.

Commander Stryker is back, the war is still raging and you must take him on another dangerous mission into

occupied territory, this time on the planet Volga.

Your objective is to steal the Volgans' latest weapon – a spacecraft fitted with a revolutionary matter/anti-matter warp drive.

This is stored underground and you must pass through rocky caverns, leaping from boulder to boulder, climbing ropes and plunging down shafts on a fast moving lift.

This is merely the surface defence. If you survive this there is an ancient shrine, the crew's quarters and a missile factory to negotiate.

This sequel is more complex than its predecessor and there is far more to the game than simply blasting your way through each screen.

For instance, you can't use the lifts unless you have the correct pass and your pressure suit and laser pistol need recharging constantly. If you can't solve these immediate problems you won't get much further than the first few caves.

There are around 15 different objects to collect, including energy cells, spanners, fuel for your jet pack and security passcards. In addition, there are buttons to press and switches to flick, though I must admit I haven't found these yet.

Microfilm cassettes are useful as they contain maps of the current level and include the Volgan guards' positions. This enables you to plan your route ahead.

You have a wrist terminal computer which can be activated at any time to check on your status. Here, you can recharge your suit and blaster provided you have picked up an energy cell.

The animation is good and slightly faster than Stryker's Run, though the scenery is graphically simpler, but it does scroll rather than flick when you reach the edge of the screen.

Stryker himself is capable of far more actions than before. He can now run, jump, climb up and down ropes, kneel and crawl through narrow crevasses on his stomach. And it's faster to boot.

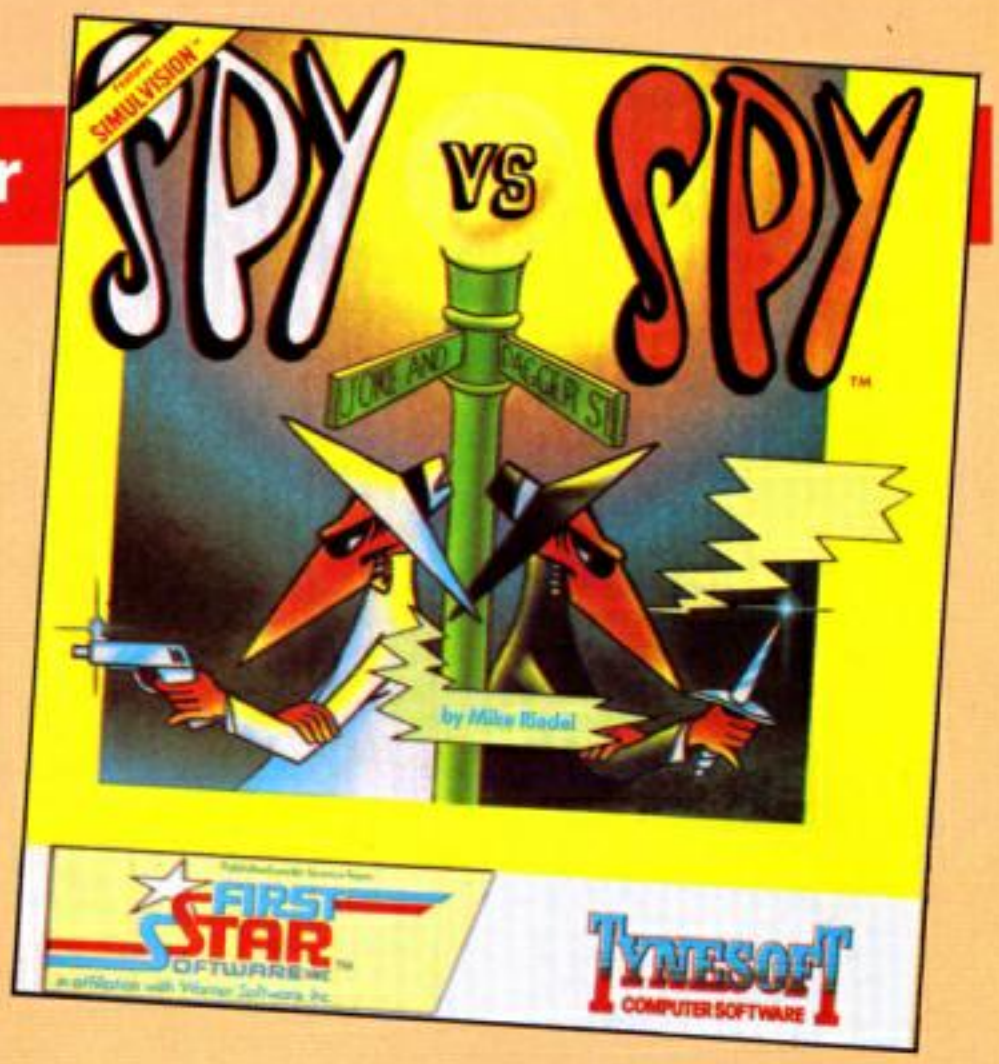
Stryker's Run is good, but Codename Droid is brilliant and deserves to do well. Reserve a place in your arcade collection immediately and start saving – it's worth every penny.

Roland Waddilove

Stryker's Run	
Sound	*6*
Graphics	*10*
Playability	*10*
Value for money	*10*
Overall	*10*

Codename Droid	
Sound	*6*
Graphics	*10*
Playability	*10*
Value for money	*10*
Overall	*10*

Superb spy thriller



Program: Spy vs Spy
Price: £9.95 (cassette only)
Supplier: Tynesoft, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE.
Tel: 091-414 4611

MY name is Bend, Roundhay Bend of the tea service and when *Electron User* needed someone to review Tynesoft's new game Spy vs Spy, I was their man.

This is one of those pieces of software you pick up, play, and after 20 minutes of fruitless fumbling, concede it's better to read the instructions first.

This is because it is more complex than it first appears and requires a lot of thought and pre-planning.

Take my advice: Don't rush until you know what you are doing. The game can be played by either one or two players, the Electron controlling your opponent if you select the one player option.

Spy vs Spy employs a clever technique it calls simulvision – a system where the screen is split horizontally across the middle, dividing it into two equal sections.

The two spies move independently of each other and their location is shown in each half of the screen – one at the top, one at the bottom. When both are in the same room only one location is shown.

Although similar systems have been used on the Electron (Dunjunz springs to mind), Spy vs Spy's display is much clearer and this makes the game easier on the eye and nicer to play.

Each room is drawn in 3D as if viewed from the front. This makes it easier to judge the relative positions of objects than other 3D games I have played.

To the right of each playing area is a peculiar looking device called a trapulator. This displays the time remaining, the objects carried, objects found and a booby trap selector.

The aim of the game is simply to recover four particular objects (I won't tell you which, it'll spoil the game) from a rival embassy, pop them in a briefcase and escape back home on an aeroplane.

On the face of it, this may seem simple, but don't forget the other spy is trying to do exactly the same thing, and he's not going to make it any easier for you.

The objects are hidden in a variety of places: Behind paintings, in cupboards, and so on. A nice feature is the way they are shifted around when they're being examined by one of the spies.

As well as the objects you are searching for, you can run into booby traps left by your rival. If you are fast enough you can see where he places them, courtesy of the clever simulvision and either avoid or disarm them.

Unfortunately, you can only pick up and carry one object or tool at once and if you are holding the wrong one, poof, the little guy floats off to that great embassy in the sky, while the other laughs himself silly.

A very useful booby trap is the time bomb, as this can't be disarmed by either spy. Once selected and dropped you have 15 seconds to leave the room or you'll go up too.

The trouble with booby traps is that either player can trigger them, so don't forget where you put them.

The control keys are a little odd, but remarkably well placed, although the Electron's keyboard is a bit cramped at the best of times for two hands, let alone four.

The game is compatible with the First Byte joystick interface so it may be possible to have one player on keyboard and one on joystick.

All other add-ons, such as Turbo Drivers, for example, should be disabled, as the game takes a long time to load and due to its complexity, can easily be crashed by such units.

For graphics and sound the game is one of the best produced for the Electron and is a credit to the whole programming team.

Overall, I have to say I have never had so much fun trying to outwit a computer at its own game and the sight of your opponent being electrocuted by touching a booby trapped doornob is hilarious.

Due to its complexity, it's not a game for younger children, although it's already caused a few squabbles among my family over who plays next. It is highly recommended.

Mark Smiddy

Sound	*8*
Graphics	*9*
Playability	*10*
Value for money	*10*
Overall	*10*

Classic compilation

Program: Five Star Games II
Price: £9.95 (cassette only)
Supplier: Beau-Jolly, 29A, Bell Street, Reigate, Surrey, RH2 7AD.
Tel: 0737 222003

BEAU-Jolly has been producing compilations almost since the beginning of computer games and Five Star Games is without doubt one of its best. Three of the five titles come from the Superior stable, showing this company's remarkable penetration of the Electron software market.

The first is Galaforce, a classic shoot-'em-up in the style of Arcadians and Zalaga. Though the idea is not original, it is executed faultlessly.

Unlike its older competitors, Galaforce gives up and down controls, as well as the conventional left, right and fire. Now you can go and get 'em, rather than wait to be shot at.

Both First Byte and Plus 1 joysticks are supported and there are facilities for pause/restart, sound on/off and quit game, as well as a nice touch of being able to redefine the playing colours.

The speed of play and the amazing

variety of aliens and attack formations is a tribute to the wonders of modern programming.

Next comes another Superior classic, Thrust, a mindbogglingly difficult but frustratingly addictive space game. It involves piloting a spaceship around the galaxy in search of power pods.

The game stands out because it follows exactly the laws of physics. As in real life, you move by burning fuel and the amount is limited. Luckily, you can replenish your supply from fuel tanks dotted around the planet's surface.

The pods are hidden in increasingly inaccessible nooks and crannies and guarded by hostile gun emplacements. Your troubles really start when you trap a pod – the handling of your ship is now completely different.

To finish a level you must destroy the planet's reactor, before blasting off with your prize into the void. A great game.

Psycastria from Audiogenic is a sideways scrolling space game, following the pattern of "even if it doesn't move, shoot it anyway".

It features some wonderful special effects: Demo mode, scrolling message, music, multi-player option, high score table – there's even a built-in cheat facility.

Your ship stays centre-stage all the time and when you flip left or right, the screen scrolls around you. This smooth scrolling is one of the most impressive features of the game.

Although the Electron version is not quite as fast as the BBC Micro, you do at least stand a chance of seeing what's about to hit you.

The only feature I found annoying is that you must clear each level in one go. When you die, you go back to the beginning and must destroy everything all over again.

This niggle aside, Psycastria certainly deserves an accolade.

Micropower's Stock Car is the oldest title in the collection, originally released four years ago. It shows its age painfully, with poor graphics and no joystick option or pause facility but when you play the game it is extremely addictive.

Races are held over distances of up to 40 laps against three other computer-controlled cars. You can play by yourself, or against another player and two computer opponents.

There are six different circuits, which require a variety of tactics and driving skills. Matters are made more difficult by oil slicks and a skidding factor, which allows you to vary the responsiveness of the car.

With a skidding factor of 0% you can drive round each circuit in top gear. At

the opposite extreme, trying to corner in too high a gear does exactly what you'd expect – you're out of control and into the catch-fencing in no time.

Stock Car isn't a game to choose if you want to impress people, but it will keep parties going for hours.

The last offering, and the third from Superior, is the martial arts game, Karate Combat. The object is simple – hit your opponent before he hits you.

You can play against the computer, a human or a punchbag. This last option allows you to practice the moves with which the computer slaughtered you last time. This is a very useful facility, as there are 17 manoeuvres to be mastered.

The graphics are good, if somewhat on the small side. Although Karate Combat was very well received on its first showing, it lacks the technical merits of its major competitors, Way of the Exploding Fist and Yie-Ar Kung Fu.

Although compilations are a good idea and a godsend to someone just starting a software collection, they do seem to be getting a little out of hand.

Two of the featured titles – Karate Combat and Stock Car – are also available on other compilations. You wonder where it will end. This small point aside, Five Star Games II represents excellent value for money.

Hac-Man

Sound	*8*
Graphics	*8*
Playability	*8*
Value for money	*8*
Overall	*8*

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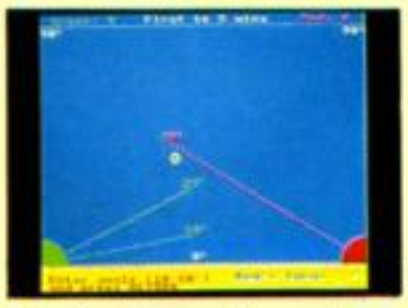


Angler: *Fun with angle estimation*

Spelldroid: Learn to spell with our friendly robot

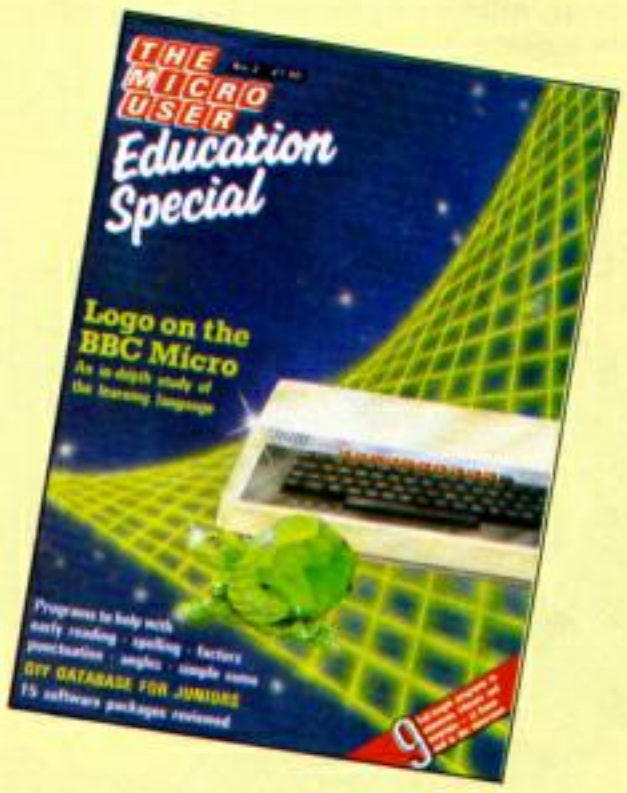
Tortal: *Teach and test the rules of single addition*

Educational Computing on the Electron

Volume 2 of *The Micro User* Education Special contains nine full length programs written to the highest standards and each picked to combine educational worth with sheer enjoyment. The nine programs cover topics from early reading and simple sums to the rules of punctuation and angle estimation – and there's an excellent introductory database.

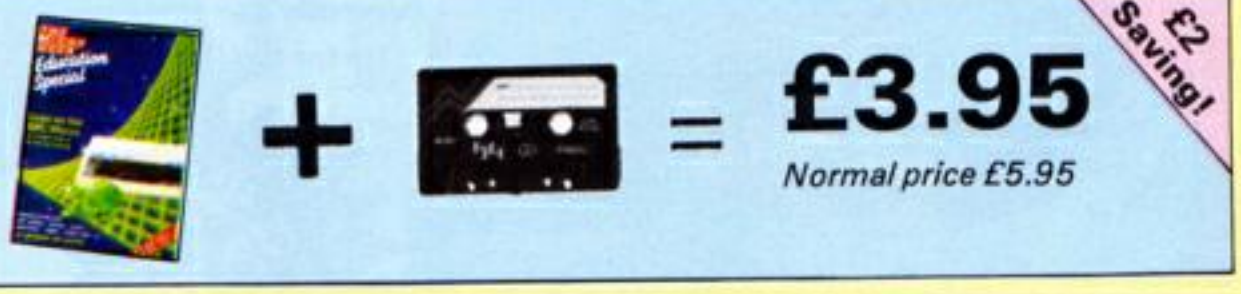
The programs on the tape and disc have been adapted for the Electron and the magazine contains all the original listings together with advice on how they can be adapted to cater for individual needs.

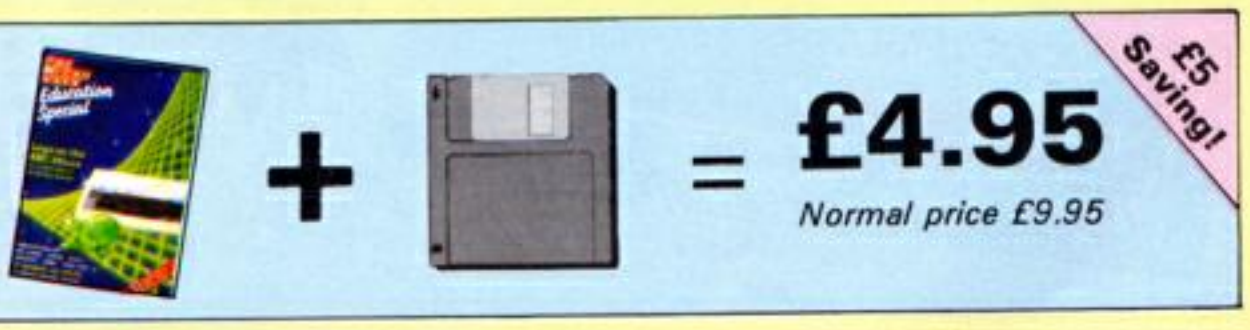
Covers all age ranges from infants to secondary.



PLUS:

Database: *A comprehensive database for the young learner.*
Chinese Takeaway: *Teach and test the rules of simple subtraction.*
Fun Factors: *Arcade style factor learning.*
Discovery: *A strategy based phrase identification game.*
Punctuation: *Test and teach the rules of punctuation.*





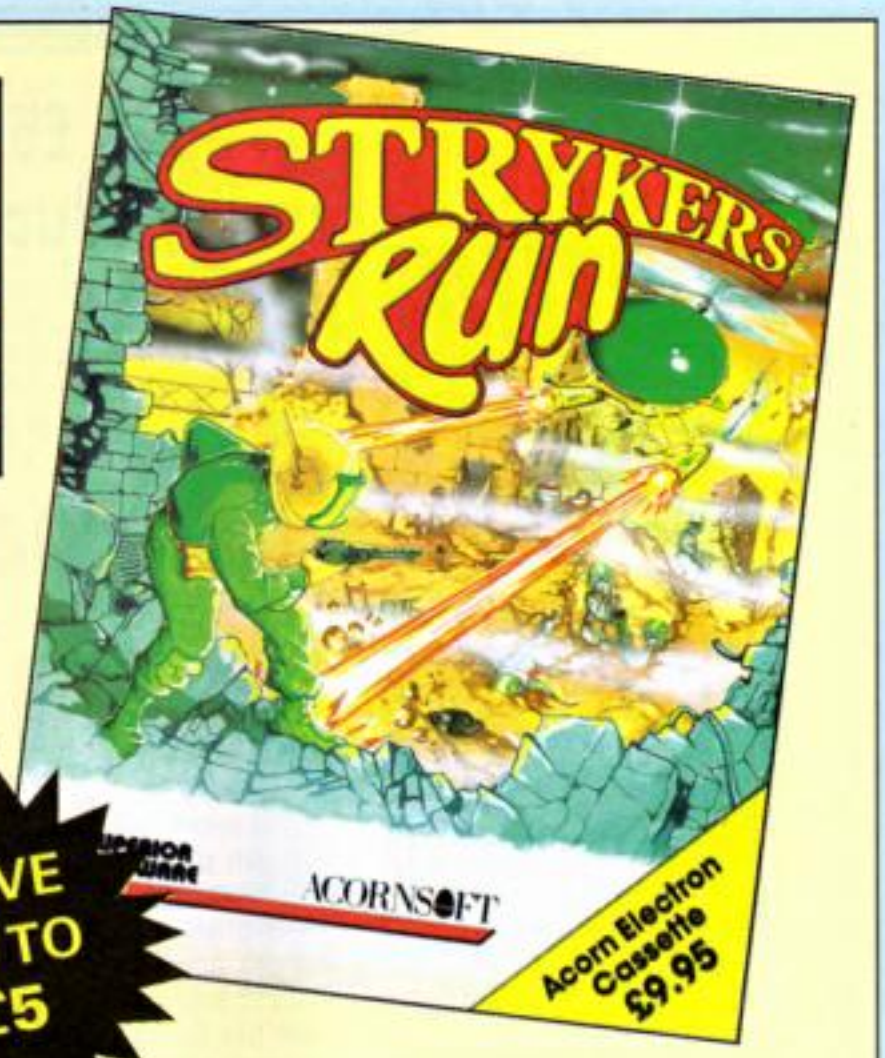
To order turn to the form on Page 53

Battle your way across the barren wastelands

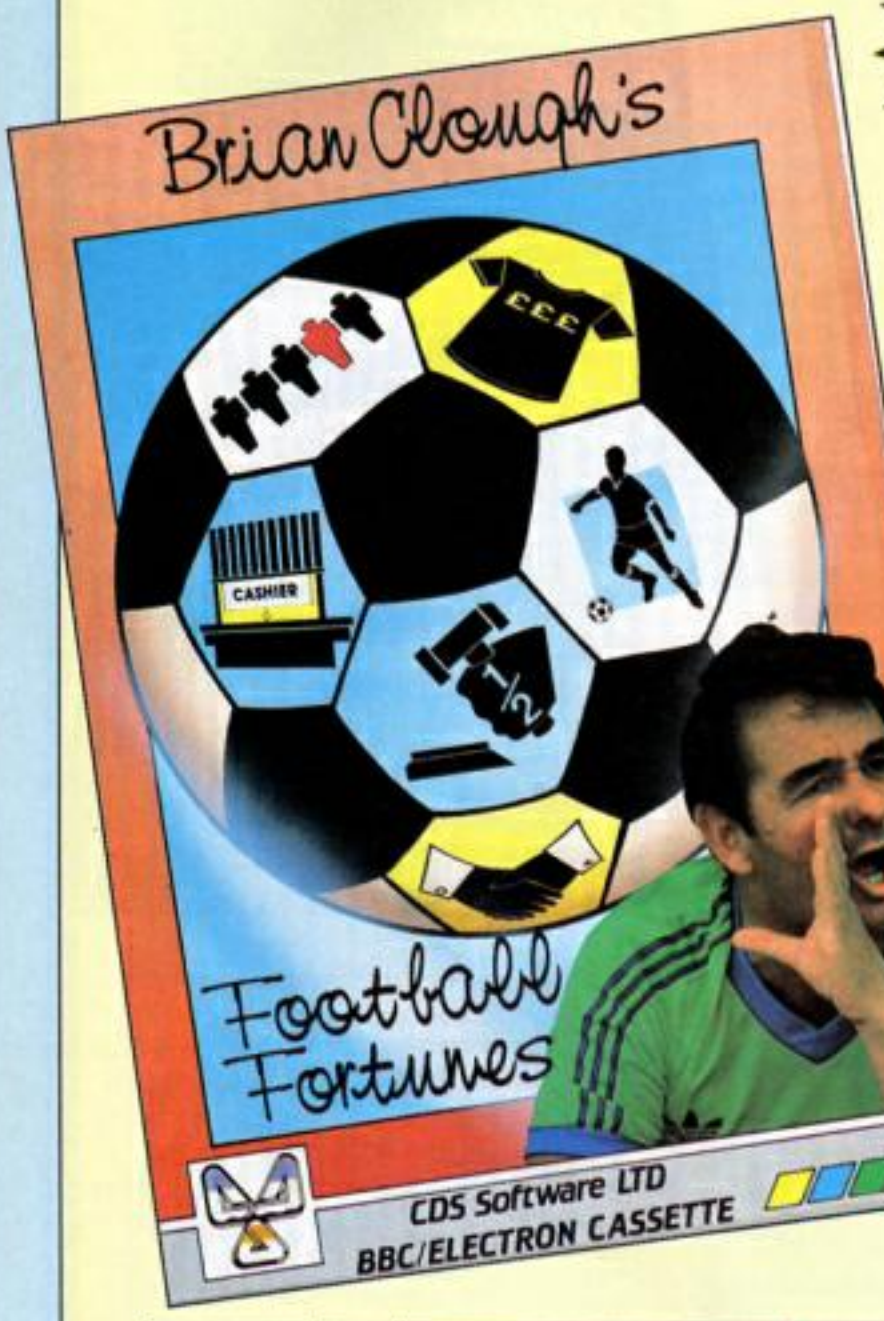
In this superb arcade-style game you play the part of Commander Stryker, tramping across the radiation-wrecked landscape, shooting down the helicopters and jetships which soar overhead. Blast the flesh off the Volgan soldiers as they come into view – and watch their skeletons crumple to the ground.

There's miles of awesome background scenery – bomb-struck buildings, military bases and gravestones to create a spine-tingling atmosphere.

Get Stryker's Run – it's a stunner!



SAVE UP TO £5



Play football's first interactive computer and board game!

Brian Clough's Football Fortunes is an exciting football management game with a difference – it combines an excellent range of computer-based features with a fascinating board game.

The result for the players is a package which is as much fun and as skilful to play as other best-selling board games, combined with the flexibility and speed of play which only a computer can supply.

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Electron	Football Fortunes	Tape	£14.95	£11.95	£3	£19.95	£7

TO ORDER PLEASE USE FORM ON PAGE 53

PRETTY AS A PICTURE

ANDREW RICHARDS presents a screen snapshot utility for disc drive owners

SNAPSHOT is a machine code utility for disc drive owners which literally takes a snapshot of the Electron's screen when you tap the Control key and saves it to disc.

It can save screens from within almost any program, utility or language. They can then be loaded and displayed individually or made into a slide show.

You can save game screens, title pages, even View editing screens. To show its flexibility, run Snapshot, enter View, load some text and press Control to take a picture of the screen.

This makes it ideal for creating a tutorial slide show for an application. It has been used to create many of the screens in *Electron User*, such as the View and Lisp editing screens and games screen dumps.

To use it, first enter and save the listing. Then run it and you'll be prompted for a suitable address at which to store the machine code.

Try &140, the bottom half of the 6502 stack and normally free. If you experience any problems saving the screen with a particular program try a different address.

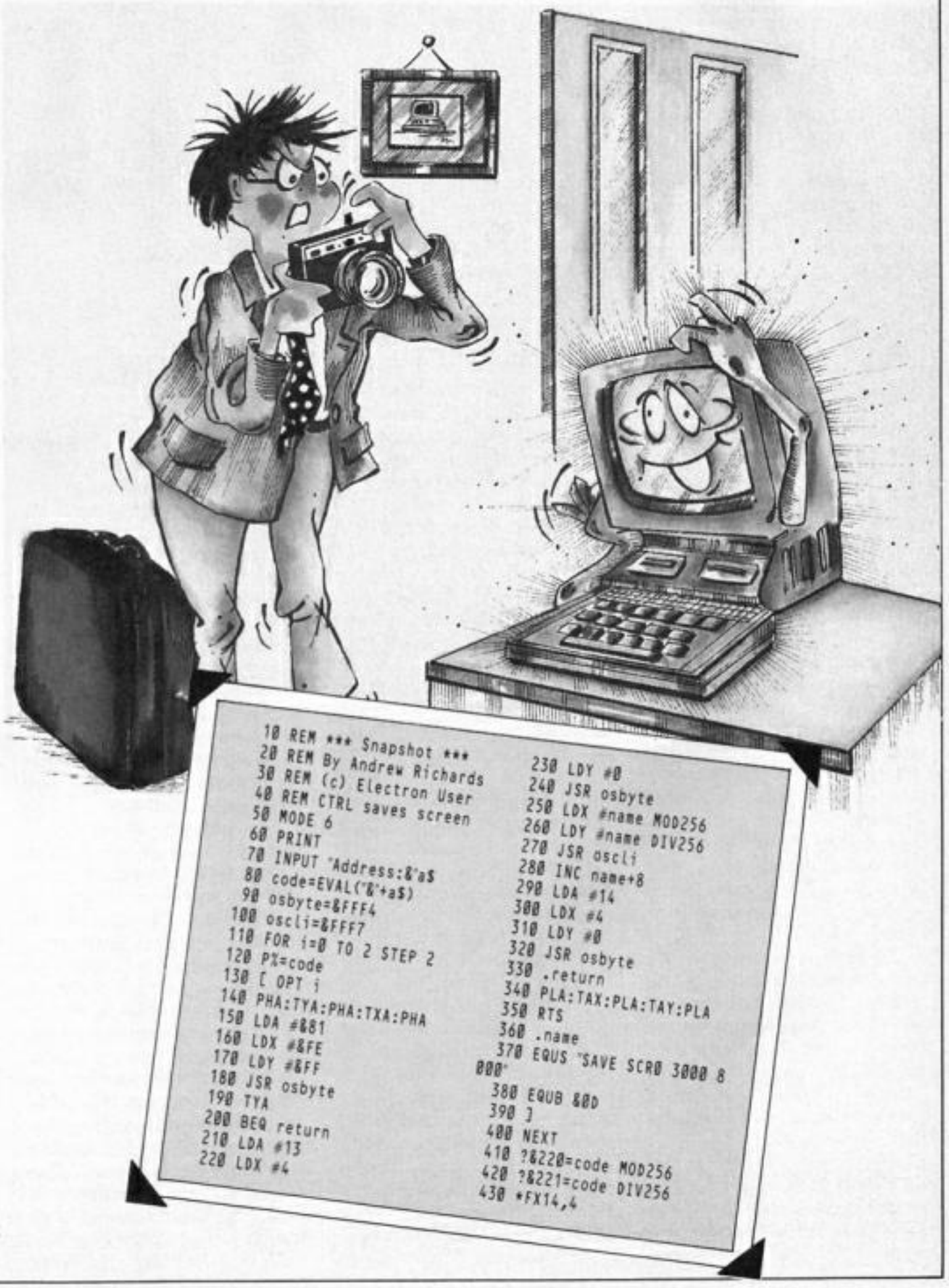
Once the machine code is set up you can delete the utility with NEW. Now load the program you wish to take a snapshot of and run it.

Pressing Control at any time will save the current screen to disc. You should of course, ensure that there is a disc with plenty of free space on it in the drive. Plus 3 owners should also make sure the disc is *MOUNTed.

The program will continue as normal after the snapshot has been taken so you can take as many snaps as you like.

The first screen is saved as SCR0, the second as SCR1, then SCR2 and so on.

To view the snapshots first select the correct mode – the one used when the screen was saved – and *LOAD the screen. You may have to redefine the colours if they aren't the default ones.



```
10 REM *** Snapshot ***
20 REM By Andrew Richards
30 REM (c) Electron User
40 REM CTRL saves screen
50 MODE 6
60 PRINT
70 INPUT "Address:&"a$
80 code=EVAL("&"+a$)
90 osbyte=&FFF4
100 oscli=&FFF7
110 FOR i=0 TO 2 STEP 2
120 P%=code
130 [ OPT i
140 PHA:TYA:PHA:TXA:PHA
150 LDA #&81
160 LDX #&FE
170 LDY #&FF
180 JSR osbyte
190 TYA
200 BEQ return
210 LDA #13
220 LDX #4
230 LDY #0
240 JSR osbyte
250 LDX #name MOD256
260 LDY #name DIV256
270 JSR oscli
280 INC name+8
290 LDA #14
300 LDX #4
310 LDY #0
320 JSR osbyte
330 .return
340 PLA:TAX:PLA:TAY:PLA
350 RTS
360 .name
370 EQUS "SAVE SCR0 3000 8
000"
380 EQUB &0D
390 ]
400 NEXT
410 ?&220=code MOD256
420 ?&221=code DIV256
430 *FX14,4
```

DEMONIC DATABASES

BILL TREVELYAN presents a game in Part III of his adventure writing series

AN adventure game consists of a database, which is largely an ordered collection of text strings, and a driving program analogous to an interpreter such as Basic.

This selects the message to be printed on the screen, firstly on the basis of the command entered by the player, and secondly the value of certain variables.

Between them, these variables summarise the state of the game at any particular time.

The interpreter can be divided into a number of subroutines, and a selection routine called a command parser decides which one is called. This in turn decides what messages, if any, are to be displayed, and updates the relevant system variables.

To make this come to life, we need to dissect an actual adventure game. Of course the ones you buy are far too long and complicated to reproduce here so Program I is a short demonstration.

This has just four locations or rooms, the object being to get from the first to the last. After all, that's what you do in any adventure game if you stop and think about it.

To keep it simple you can only move in a straight line north or south. You have to work out how to get past a door in location one and avoid a trap in location three. There are three objects you can GET or DROP.

The command interpreter is rudimentary. First, you enter a verb, for instance TAKE, followed by Return then enter the noun separately, or just Return if it doesn't need one.

If you make a mistake you will have to enter a new command from the beginning. Crude certainly, but it serves its purpose.

The database, is a series of data statements starting at line 4000. The data is in the form of five lists – a list being a collection of data, numerical or string of the same general type.

Each item is assigned an index number so it can be accessed by the program.

In the example, there are four location descriptions numbered one to four. The current location number is held in *L%*.

The data stored in the program can be read, but not written to as the game proceeds. For this reason the two lists of numeric variables are first copied into arrays.

The first gives the location number associated with each object, the location of the *n*th object being held in *ob%(n)*. A fifth location numbered 255 is used to accommodate objects possessed by the player.

If *ob%(2)* is 4, object number two is in location number four. If it is 255, it is held by the player and will be listed as such if INV (INVentory) is entered.

Clearly, the location number of each object will change as the game is played out.

The second list which needs to be updated from time to time holds the value of a series of flags. These are variables, which can be either zero or one and determine which of several possible paths a subroutine is to follow.

The flags are held in the array *f%()*. To illustrate their function, *f%(3)* is assigned to the door in location one and is zero if it is shut, one if it is open.

If the player wants to go north from location one the program examines the value of *f%(3)*. If it is one it lets him pass, if not it, tells him he can't move and why.

As you can see, flags are extremely important in adventure games.

The general structure of the operating system of a simple adventure game program is shown in Figure I.

When such a program is run, the first step is to copy the list giving the location of each object, and the list of flag values into a form which can be written to as well as read.

The original lists must be preserved so a game can be restarted without the program having to be loaded from tape all over again. The other status variables *L%* and *T%* are initialised normally.

Next a REPEAT ... UNTIL loop is entered which first inquires whether a move has been made. The move flag *f%(1)* is set to indicate this.

When the program is run, the initialisation procedure sets this so the first location description appears on the screen. The player is then asked to enter a command from Table I and a noun from Table II.

The most important part of the program is the command parser or interpreter. This examines the command entered by the player and selects which of the library of subroutines is to be called.

The move flag is cleared and the verb entered is compared with each permissible verb in turn. If no match is found, the player is told, "You can't do that", and is asked to enter another command.

If a match is found, the IF ... THEN statement directs control to the appropriate subroutine or procedure. PROCunl is entered for instance, if the verb entered is UNLOCK.

The subroutine selected can have one of three outcomes:

- The player has moved (the current location number has been altered) or has entered LOOK, in which case the move flag is set.
- The player has asked for a move which has been refused, or the subroutine is one which alters a status variable other than *L%*, in response to say GET, or saves the game position to, or loads it from tape, in which case the move flag is clear when the subroutine is exited.
- The player has died by falling into a trap, or has asked to end the game by entering Q, for quit, when the end game flag f%(0) is set. In this case, the loop is terminated and the player is asked if he wants another game.

The subroutines themselves fall into two classes, those which would be found in any game and those special to a particular game.

There are several object handling subroutines for picking up or dropping objects, and for listing those held.

GET: Is the player holding the maximum number of objects? If he is, say so, and return. Is he allowed to pick up the object? If not, say so, and return. Has he already got it? If yes, say so and return.

Is it at the current location? If not, say so and return. Otherwise change the object's location number to 255 and increment T%, the number of objects held.

DROP: If the object isn't recognised by the program, or if it is and the player hasn't got it, say so and return. Otherwise change the location number allotted to the object to the current location number.

INV: Examine the location number of each object. Is it 255? If so, print a short description. If there are no objects carried, print "nothing".

For the save routine the values of the status variables are first poked into memory starting from &C00, which is free since user defined characters are not used. This section of memory is saved on tape and the load routine simply reverses this process.

NORTH	OPEN
SOUTH	UNLOCK
GET	LOOK
TAKE	SAVE
DROP	LOAD
I	
INV	

Table I: Verbs accepted by Program I

If these were the only procedures in the interpreter program, the player could move at will through all the locations. He could pick up and drop objects and that's all.

The special subroutines create the problems necessary to make a game interesting. They mostly take the form of exit programs which have to be executed before a player is allowed to move in a particular direction from a particular location.

They can be very simple such as when the player merely has to enter OPEN DOOR to gain access to a room.

I particularly admired the trick in Robico's Enthar Seven, where you are confronted with locked steel doors. All you have to do is ignore this and simply enter NORTH. The door slides open before you.

Of course, I spent a long time trying to open or unlock it before I cottoned on. This illustrates the important point that imagination beats complexity every time.

More usually, you have to carry certain objects, drop them in a particular place, or alter the value of a number of flags by entering special commands, and the like.

Ideally, you should write down a general outline of the plot, a complete list of location descriptions, with a map showing their interconnections, a list of objects and the vocabulary.

If you haven't got that systematic cast of mind, my advice is to jot down a few

DOOR	KEY
BOX	SWORD
JEWELS	

Table II: Nouns accepted by Program I

location descriptions and then write the shell program, that's the part which remains the same from game to game.

When you can move around and pick up or drop objects, you can start to insert exit programs and build up the game.

The example given here needs a little beefing before it can be made the basis of a satisfactory game. In particular, the command parser could be improved, and the move routines elaborated to allow locations to be linked into more satisfyingly complex patterns.

Another significant improvement could be made in the way the flags are handled. If only three or four are used an array is quite acceptable, however a large adventure may use 30 or more.

As arrays take up large amounts of memory, it is better to construct a series of functions to make use of Basic's bitwise logical operators.

Program II provides a demonstration of four functions to set, reset, invert and read any of the 31 numbered flags held by *F%*. On exit all of the functions return the previous value.

This technique has the advantage of being very memory efficient, but makes the resulting program difficult to debug.

Actually the fascination of adventure game programming lies in the fact that there are so many ways a given effect can be achieved. Perfection is never reached – you're always thinking "now, if I do that, I wonder if ..."

Turn to Page 22 ▶

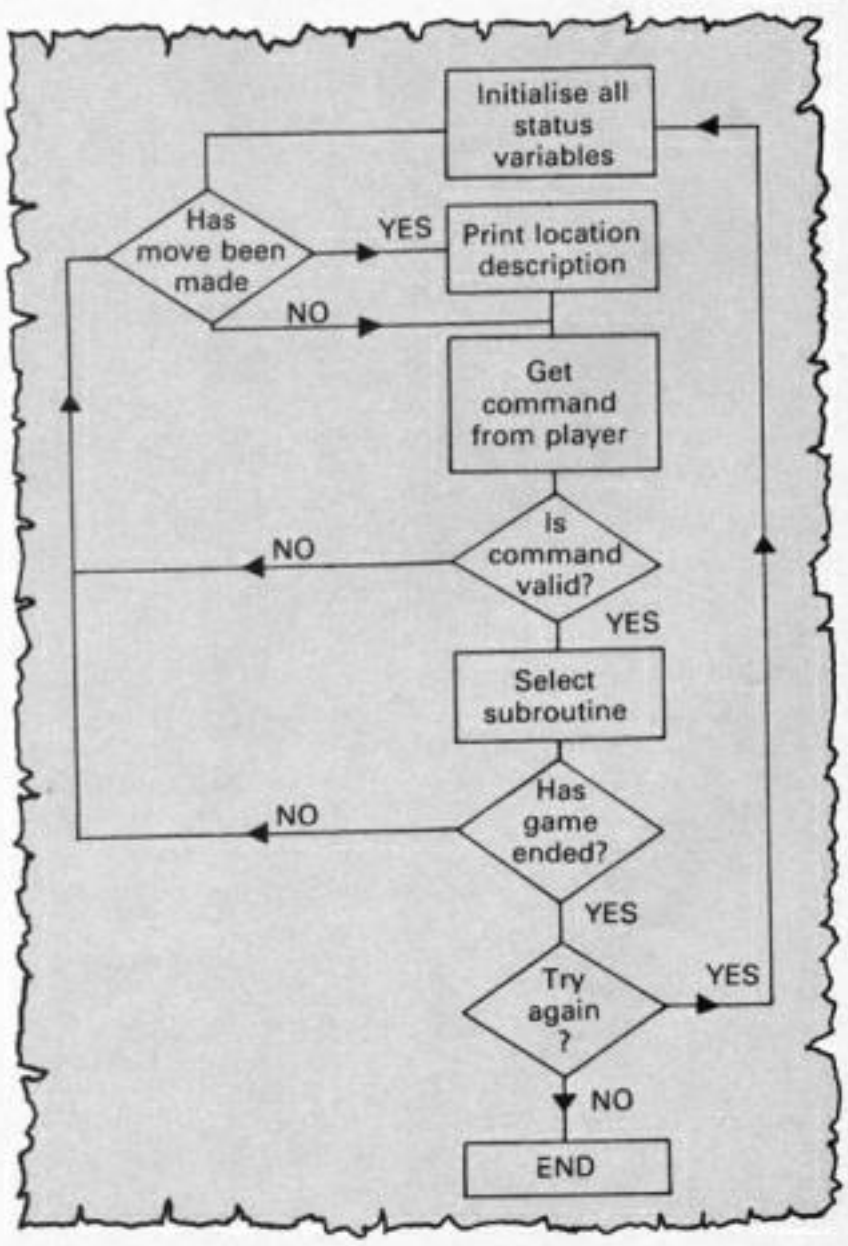


Figure I: Structure of a simple adventure game program

Programming

◀ From Page 21

Program I

```
   10 REM Program I
   20 :
   30 OB%=3:FL%=5
   40 DIM ob%(OB%),f%(FL%)
   50 RESTORE 4010
   60 FOR I%=1 TO OB%:READ o
b%(I%):NEXT
   70 :
   80 CLS:L%=1:T%=0
   90 FOR I%=0 TO 5:READ f%(
I%):NEXT
  100 :
  110 REPEAT
  120 IF f%(1)=0 THEN 140
  130 PROCloc(L%)
  140 INPUT"" Verb:" x$
  150 INPUT"Object:"y$
  160 CLS:PROCselect
  170 UNTIL f%(0)
  180 INPUT""Another go? (Y
/N) "a$
  190 IF a$="Y" OR a$="y" TH
EN 50
  200 CLS:PRINT TAB(12,12)"G
 O O D   B Y E !"
  210 END
  220 :
  230 DEFPROCselect
  240 f%(1)=0: REM Clear Mov
e flag
  250 IF x$="GO" THEN x$=y$:
y$=""
  260 IF x$="N" OR x$="NORTH
" THEN PROCnor:ENDPROC
  270 IF x$="S" OR x$="SOUTH
" THEN PROCsou:ENDPROC
  280 IF x$="GET" OR x$="TAK
E" THEN PROCget:ENDPROC
  290 IF x$="DROP" THEN PROC
drop:ENDPROC
  300 IF x$="I" OR x$="INV"
THEN PROCinv:ENDPROC
  310 IF x$="OPEN" PROCope:E
NDPROC
  320 IF x$="UNLOCK" PROCunl
:ENDPROC
  330 IF x$="LOOK" PROClook:
ENDPROC
  340 IF x$="SAVE" PROCS:END
PROC
  350 IF x$="LOAD" PROCL:END
PROC
  360 IF x$="Q" THEN PROCq:E
NDPROC
  370 PROCm(5):ENDPROC
  380 :
  390 DEFPROCloc(l%)
  400 PROCm(l%+17)
  410 f%(2)=0:FOR I%=1 TO OB
%:IF ob%(I%)=l% THEN f%(2)=1
:PRINT" - ";:PROCm(I%)
  420 NEXT:IF f%(2) PRINT"
  can be seen here"
  430 ENDPROC
  440 :
  450 DEFPROClook
  460 f%(1)=1:ENDPROC
  470 :
  480 DEFPROCnor
  490 IF L%=4 f%(0)=1:ENDPRO
C
  500 IF L%=1 AND f%(3)=0 PR
OCdoor:ENDPROC
  510 IF L%=3 AND FNtrip=TRU
E THEN f%(0)=1:PROCm(16):END
PROC
  520 L%=L%+1:f%(1)=1:ENDPRO
C
  530 :
  540 DEFPROCsou
  550 IF L%=1 PROCm(5):ENDPR
OC
  560 IF L%=3 AND FNtrip=TRU
E THEN f%(0)=1:PROCm(16):END
PROC
  570 L%=L%-1:f%(1)=1:ENDPRO
C
  580 :
  590 DEFPROCdoor
  600 PROCm(12):ENDPROC
  610 :
  620 DEFPROCope
  630 IF y$="DOOR" PROCm(13)
:ENDPROC
  640 IF y$="BOX" AND ob%(1)
=&FF THEN f%(3)=1:PROCm(15):
ENDPROC
  650 PROCm(5):ENDPROC
  660 :
```

This is one of hundreds of programs available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

```
  670 DEFPROCunl
  680 IF ob%(1)<>&FF AND ob%
(2)<>&FF THEN PROCm(5):ENDPR
OC
  690 PROCm(14):ENDPROC
  700 :
  710 DEFPROCget
  720 IF T%>1 PROCm(6):ENDPR
OC
  730 IF y$="BOX" OR y$="JEW
ELS" THEN PROCg(1):ENDPROC
  740 IF y$="KEY" PROCg(2):E
NDPROC
  750 IF y$="SWORD" PROCg(3)
:ENDPROC
  760 PROCm(5):ENDPROC
  770 :
  780 DEFPROCg(o%)
  790 IF ob%(o%)=&FF PROCm(7
):ENDPROC
  800 IF ob%(o%)=L% THEN ob%
(o%)=&FF:T%=T%+1:PROCm(9):PR
INT:PROCm(o%):ENDPROC
  810 PROCm(5):ENDPROC
  820 :
  830 DEFPROCdrop
  840 IF T%=0 PROCm(8):ENDPR
OC
  850 IF y$="BOX" OR y$="JEW
ELS" THEN PROCd(1):ENDPROC
  860 IF y$="KEY" PROCd(2):E
NDPROC
  870 IF y$="SWORD" PROCd(3)
:ENDPROC
  880 PROCm(5):ENDPROC
  890 :
  900 DEFPROCd(o%)
  910 IF ob%(o%)<>&FF PROCm(
8):ENDPROC
  920 ob%(o%)=L%:T%=T%-1:PRO
Cm(10):PRINT:PROCm(o%):ENDPR
OC
  930 :
  940 DEFPROCinv
  950 PROCm(11):PRINT
  960 inv%=FALSE
  970 FOR I%=1 TO OB%:IF ob%
(I%)=&FF THEN inv%=TRUE:PRIN
T" - ";:PROCm(I%)
  980 NEXT
  990 IF NOT inv% PRINT" - n
othing"
 1000 ENDPROC
 1010 :
 1020 DEF FNtrip
 1030 I%=0:REPEAT:I%=I%+1
 1040 UNTIL ob%(I%)=3 OR I%=
3
 1050 IF ob%(I%)=3 =TRUE ELS
E =FALSE
 1060 :
 1070 DEFPROCq
 1080 f%(0)=1:ENDPROC
 1090 :
 1100 DEFPROCm(m%)
 1110 RESTORE (5000+m%):READ
 text$:PRINTtext$
 1120 ENDPROC
 1130 :
 1140 DEFPROCS
 1150 FOR I%=0 TO 5:I%?&C00=
f%(I%):NEXT
 1160 ?&C10=L%:?&C20=T%
 1170 FOR J%=0 TO OB%:J%?&C3
0=ob%(J%):NEXT
 1180 *SAVE AFILE C00 C50
 1190 ENDPROC
 1200 :
 1210 DEFPROCL
 1220 *LOAD AFILE
 1230 FOR I%=0 TO 5:f%(I%)=I
%?&C00:NEXT
 1240 L%=?&C10:T%=?&C20
 1250 FOR J%=0 TO OB%:ob%(J%
)=J%?&C30:NEXT
 1260 PROClook:ENDPROC
 1270 :
 4000 REM Initial Location o
f objects
 4010 DATA 1,1,3
 4020 :
 4030 REM Initial value of f
lags
 4040 DATA 0,1,0,0,0,0
 4050 :
 5000 REM Description of obj
ects
 5001 DATA A box of jewels
 5002 DATA A rusty key
 5003 DATA An antique sword
 5004 REM Messages
 5005 DATA You can't do that
 5006 DATA You can't carry a
ny more
 5007 DATA You already have
it
 5008 DATA You aren't holdin
g it
 5009 DATA You take:-
 5010 DATA You drop:-
 5011 DATA You are carrying
 5012 DATA The door is close
d
 5013 DATA How?
 5014 DATA There's no keyhol
e
 5015 DATA A tune plays and
the door swings open!
 5016 DATA You trip up and b
reak your neck, alas!
 5017 REM Locations
 5018 DATA You are in a room
 with a door north
 5019 DATA A gloomy passage
is cut into the rock
 5020 DATA Daylight filters
through an archway
 5021 DATA You are free! Con
gratulations!
```

Program II

```
   10 REM Program II
   20 :
   30 F%=RND(&FFFFFF)
   40 MODE6
   50 VDU 19,0,4;0;
   60 REPEAT
   70 PROCshow
   80 REPEAT
   90 INPUT TAB(0,14)"Use wh
ich flag "B%
  100 UNTILB%>=0 AND B%<=30
  110 PRINT"Set, Reset, Inv
ert (S/R/I) ";
  120 g$=GET$:PRINTg$
  130 IF INSTR("sS",g$) THEN
 b%=FNset(B%)
  140 IF INSTR("rR",g$) b%=F
Nreset(B%)
  150 IF INSTR("iI",g$) b%=F
Ninvert(B%)
  160 PRINT"Flag ";B%;" was
:";b%
  170 UNTIL0
  180 :
  190 DEFPROCshow
  200 VDU 31,0,1
  210 PRINT "Current flag st
atus""
  220 FOR N%=30 TO 0 STEP-1
  230 IF N%=20 OR N%=10 PRIN
T"
  240 PRINT ;FNtest(N%);"
";:VDU 8,8,8,8,11,:PRINT;N%;
:VDU 9,9,10
  250 NEXT
  260 ENDPROC
  270 :
  280 DEF FNset(bit%)
  290 LOCAL b%
  300 b%=FNtest(bit%)
  310 F%=F% OR (2^bit%)
  320 =b%
  330 :
  340 DEF FNreset(bit%)
  350 LOCAL b%
  360 b%=FNtest(bit%)
  370 F%=F%-(2^bit)
  380 :
  390 DEF FNinvert(bit%)
  400 LOCAL b%
  410 b%=FNtest(bit%)
  420 F%=F% EOR (2^bit%)
  430 =b%
  440 :
  450 DEF FNtest(bit%)
  460 IF bit%>30 THEN PRINT"
Error":END
  470 =(F% AND (2^bit%)) DIV
 (2^bit%)
```

This listing is included in this month's cassette tape offer. See order form on Page 53.

Get knitting on your micro with

Knitwear Designer

Now you can use your BBC Micro or Electron to design perfectly-fitting knitwear – then print out the complete pattern.

It's the biggest development since the home knitting machine – and it's so simple to use. Now anyone can use a computer to design knitwear to individual measurements and then produce row-by-row knitting instructions on the printer.

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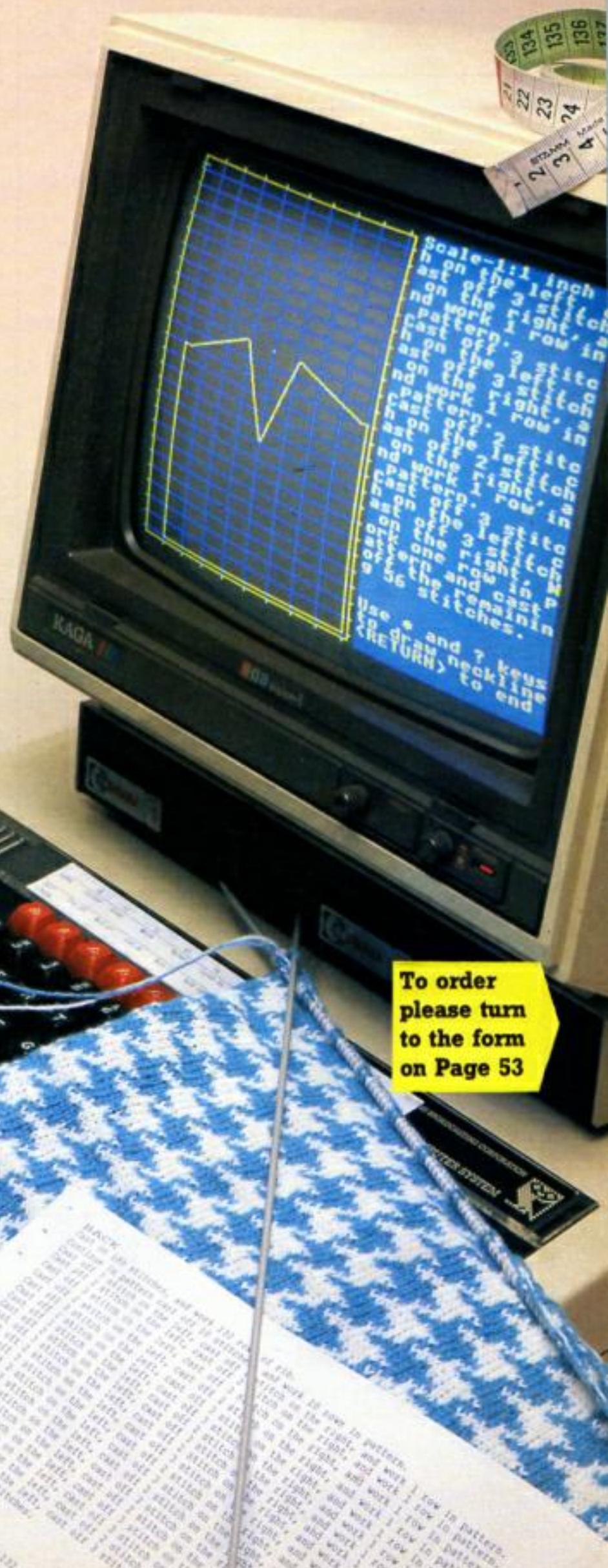

The program itself produces a plain knit, leaving you to use your own favourite stitch pattern, such as the Fair Isle design featured here.

To order please turn to the form on Page 53

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Round up all that free space

PAUL CLARKE and JEFF NEILD present an ADFS compacter

COMPACTING a Plus 3 disc containing a large number of fragments of free space can be time-consuming, especially as it is necessary to type *MAP to see whether the disc needs compacting or not.

If it does, the cursor must be turned off, because the compaction routine supplied with the Plus 3 defaults to using screen memory as temporary workspace.

If the cursor is flashing it will without doubt corrupt data on the disc.

When the routine has finished, the free space map has to be checked again to see whether the disc requires further compaction.

If two or more spaces are remaining the process has to be repeated from the start.

This is a laborious task, and it's all too easy to make a potentially fatal mistake.

The simple way to get round these problems is to let the computer do all the work.

This utility does just that, and can be used either when a Compaction Required error occurs, or at any time to tidy up a disc, a process known as housekeeping.

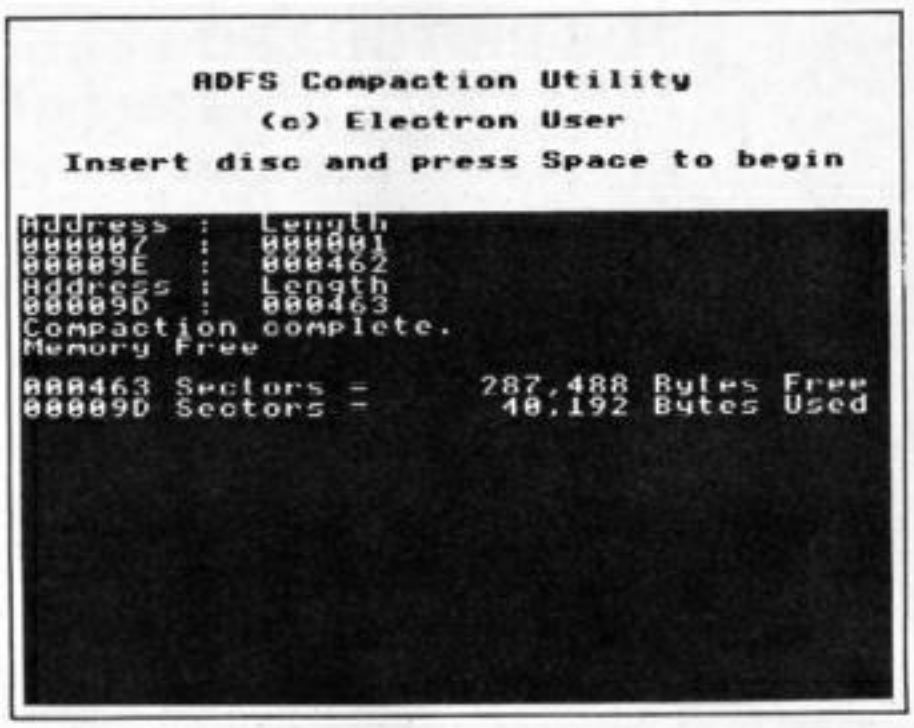
When the program is run insert the disc to be compacted and press the spacebar to start.

The ADFS compacter is directed to use the free memory above the program instead of the screen.

This means that the amount allocated to temporary storage is almost 14k, opposed to only 8k if the Mode 6 screen is used.

This makes it more efficient and faster than normal.

The program will not stop until all free spaces left have been collected. When it has finished, the amount of disc space remaining in bytes will be displayed.



If you wish to stop the program use Escape and not Break, otherwise the free space map will be corrupted and data will be lost.

Mode 4 is used for the display to allow the use of memory locations from &2000 to &5700 for temporary workspace.

When testing this program it is essential not to use any discs that contain important information.

To test the utility run Program I with a blank, formatted disc in the drive. This will create a test directory, call TEST–DIR, and place 47 files in it.

Now run Program II. This will delete only the even numbered files, simulating a disc badly in need of compaction.

You can now compact the disc using Program III.

To make the utility run from the Welcome disc as a star command, insert the disc and type:

```
*MOUNT
*DIR $.LIBRARY
*BUILD ECOMPACT
*DIR $.LIBRARY.BASIC
CHAIN "ECOMPACT"
```

and press Escape to close the file. Now save Program III in the $.LIBRARY.BASIC directory with the name ECOMPACT.

Now all you have to do is type *ECOMPACT to compact a disc. ■

```
10 *MOUNT
20 *CDIR TEST_DIR
30 *DIR TEST_DIR
40 FOR N%=0 TO 46
50 OSCLI "SAVE TEST"+STR
$(N%)+" 2000 2100"
60 NEXT
```

Program I

```
10 *MOUNT
20 *DIR TEST_DIR
30 FOR N%=0 TO 46
40 IF N% MOD 2=1 OSCLI "
DEL. TEST"+STR$(N%)
50 NEXT
```

Program II

```
10 REM ADFS Compacter
20 REM By Paul Clarke
21 REM and Jeff Nield
30 REM (c) Electron User
40 A%=0:Y%=0
50 IF NOT FNadfs VDU 7:PR
INT"This utility is for Acor
n ADFS only.":END
60 MODE4
70 VDU 23,1;0;0;0;0;
80 VDU 19,0,6;0;19,1,0;0;
90 PRINTTAB(8,1);"ADFS Co
mpaction Utility"
100 PRINT TAB(11,3);"(c) E
lectron User"
110 PRINTTAB(2,5);"Insert
disc and press Space to begi
n"
120 VDU 28,0,31,39,8
130 COLOUR 0
140 COLOUR 129
150 CLS
160 PRINT
170 A%=FALSE
180 *FX 21
190 REPEAT UNTIL GET=32
200 *MOUNT
210 CLS
220 *MAP
230 REPEAT
240 *COMPACT 20 37
250 IF VPOS>19 CLS
260 Y%=VPOS
270 *MAP
280 IF VPOS-Y%<3 A%=TRUE
290 UNTIL A%
300 PRINT"Compaction compl
ete.""Memory Free"
310 *FREE
320 *FX 211,1
330 *FX 212,241
340 *FX 213,200
350 *FX 214,4
360 VDU 7,26,31,0,31
370 VDU 23,1,1;0;0;0;
380 END
390 :
400 DEF FNadfs
410 S%=USR(&FFDA) AND &FF
420 =S%=8
```

Program III

Add wheels to your micro

JOE PRITCHARD continues his series with the start of a new project – the Electron Buggy

THIS month, we'll start construction of a small buggy which can be controlled by the Electron. It won't be as sophisticated as the BBC Buggy or commercially available ones, but it will be cheap and fun.

It's also expandable and we'll be modifying it in the future to accommodate new techniques. We'll start by looking at what makes a buggy go – the motors.

Figure I shows the way in which a typical buggy is arranged. Two motors are used – the minimum number needed to enable the vehicle to turn, go forward or backward.

The procedure for going forwards, backwards or turning is:

- **Forwards** – both motors running forwards.
- **Backwards** – both motors running backwards.
- **Turning left** – the left hand motor runs backwards or is turned off while the right hand motor runs forward. The angle of turn is determined by the length of time the left hand motor is turned off.
- Turning right – this is similar to turning left, except it's the right hand motor that is run in reverse or kept stationary, while the left hand motor is run forwards.

There are two types of motor suitable for buggy building – the DC and stepper. Let's look at each of these in turn.

Stepper motors are precision instruments and two signals are applied. One is a direction signal, indicating whether the motor is to turn clockwise or anti-clockwise. The other turns the motor one step at a time.

This second signal is a stream of pulses and each one rotates the motor by one step. These can be as small as one or two degrees of rotation and are always the same size.

If the motor is driven forward by a set number of steps, it will always turn through the same angle each time. The stepper motor thus allows very precise control over a buggy or other robot.

Steppers are quite expensive, however (£5 or more each), so for our buggy we'll use the simpler DC type of motor.

Whereas the stepper when pulsed, rotates a fixed amount each time, a DC motor goes like the clappers until the voltage across it is removed. This type of motor is often found in toy cars and can be bought for between 50p and £1.

When a voltage is applied to a DC motor it rotates continuously until the voltage is removed. This makes it rather imprecise, as different motors rotate at slightly different rates, even if they are the same type. Reversing the motor is easy: Simply reverse the voltage to the motor.

We can exercise some degree of control over the motor by making the controlling voltage a series of pulses. This will vary the speed of the motor depending upon the amount of time the pulse stream spends at say, 5V compared with the amount of time it spends at 0V. This is called the mark/space ratio of the pulse stream.

This method of controlling the speed is an example of pulse width modulation. These pulses can easily be produced by software and fed to the buggy motors through a user port.

To control our DC motor adequately for this simple buggy we'll need to build a circuit that allows the motor to be pulsed to control the speed and which allows the

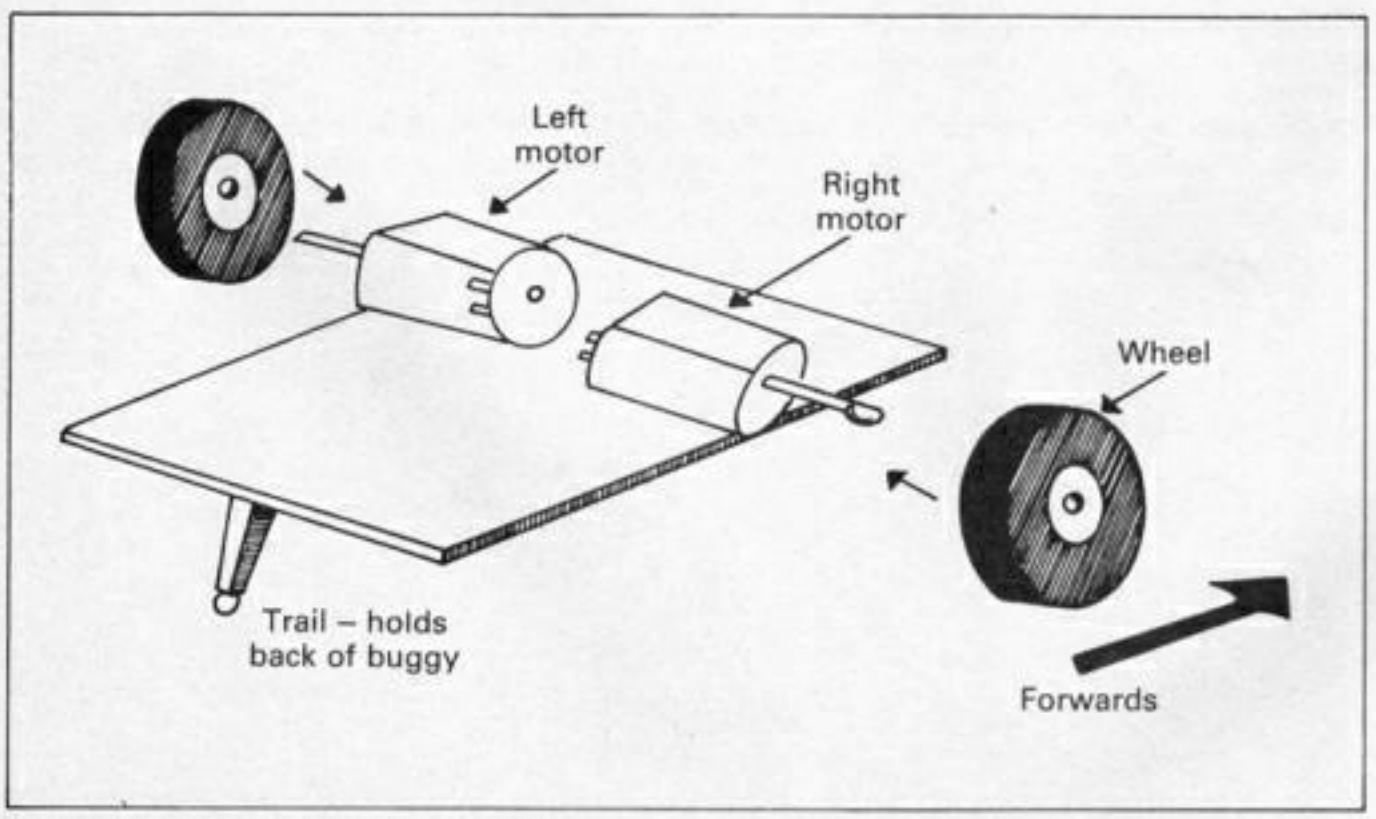


Figure I: Arrangement of a typical buggy

direction of the motor to be changed so we can go forward or backward. Figure II shows the circuit used.

Looks complicated, doesn't it? We'll spend the rest of the time looking at the circuit and seeing how it works.

At the heart is a chip, called a ULN2003 Darlington Driver (IC1). This small chip contains seven transistor switches, a bit like the one we used to drive the LED last time.

However, the switches in the chip have been specially designed to switch bigger currents (about half an amp each) and have protection circuits that allow motors to be driven with ease.

The switch inputs are on pins one to seven, and the outputs corresponding to these inputs are on pins 16 to 10.

If we apply a 5V signal to pin one, that switch will turn on and allow a current to pass through anything connected between the positive supply and pin 16.

Pin nine of the chip is the 0V line and all the current entering the chip through loads connected to the outputs leaves via this pin. I've put resistors in the inputs to each switch. These aren't necessary with all user ports, but I put them in for safety.

The other major components are two DPDT relays. These are used to control the direction of the motor. Figure III shows the relay used in greater detail.

The coil is simply an electromagnet, which, when a current passes through it, causes the two switch blades a and b to be pulled down from their normal position.

In one position, an electrical connection occurs between a and d and b and e and in the other position a direct connection exists between a and c and b and f. There's no connection between a and b.

We can use relays of this type to reverse the motor direction. If you examine the circuit, you'll be able to follow the connections between each motor and the power supply.

The two motors are small electric ones I bought from Tandy. They're designed to run on voltages between 1.5 and 4.5V. In this circuit they're running at about 4 to 4.5V, but they don't get too warm.

Across each motor is a small capacitor. These cut down electrical interference from the motors causing interference to nearby radios or TV sets and, more importantly, prevent computer crashes.

The 4.5V supply is made up of three 1.5 Volt D size cells, rather than taking any power for the motors from the Electron. This is advisable, because the motors and relays do take a reasonable amount of current.

● *Next month we'll see how to build this circuit and construct the rest of the buggy, so get your parts ordered now.*

Turn to Page 30 ►

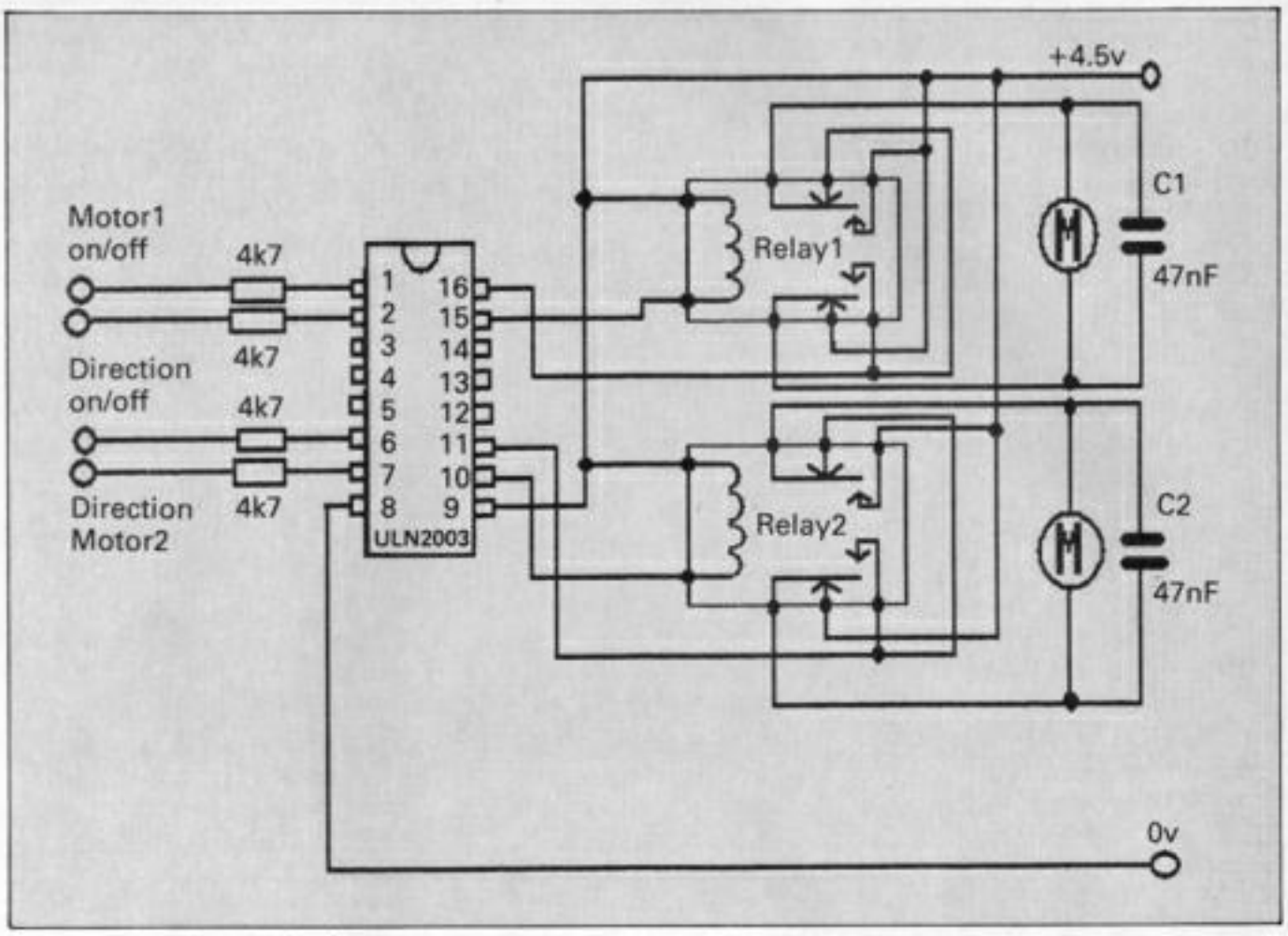


Figure II: The motor circuit

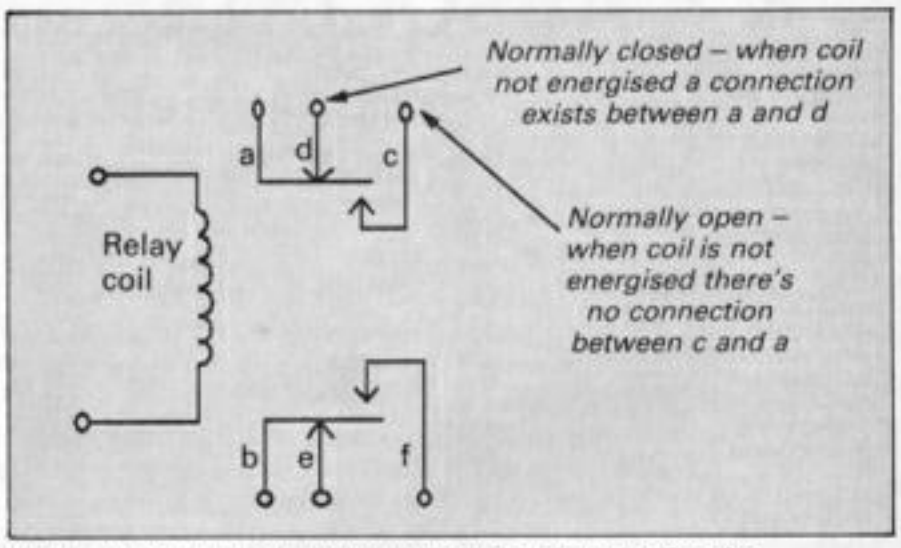


Figure III: The relay used to control the motor's direction

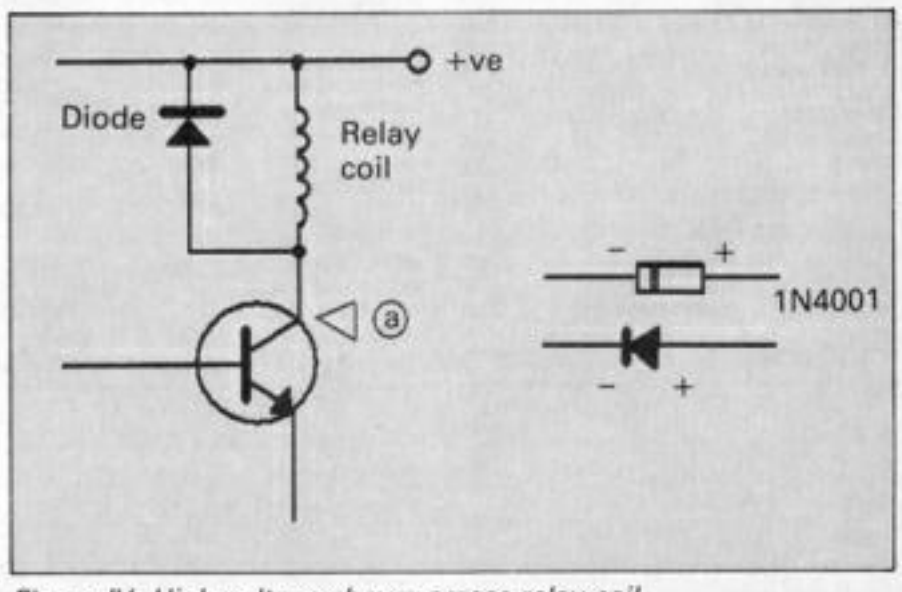


Figure IV: High voltage shown across relay coil

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Motors and relays

Motors and relay coils are called inductive loads. With such a load, when the current flowing through it is stopped – that is, by a transistor switch turning off – a very large voltage appears across the motor or relay coil.

From our point of view, this is very important as the voltage can easily be high enough to destroy a transistor or integrated circuit chip. In addition, this short lived voltage peak can crash the computer.

For this reason, it's a good idea to protect the transistors we use for switching with a component called a diode.

This has the useful property of allowing current to flow in only one direction.

In Figure VI, when the relay is switched off a high voltage will appear at point a.

Once this becomes more positive than the voltage on the positive supply line, a current will flow through the diode and the transistor will be protected from damage.

The diode only conducts when point a in the circuit is more positive than the supply voltage.

The diode thus offers considerable protection to the transistor. If you use motors or relays in this way, a diode should always be connected. A commonly used diode for low voltage motors is called the 1N4001.

You'll have noticed in our circuit we haven't used any diodes. This is because they're actually built in to the transistor switches on the chip, so we needn't worry about them.

As an additional aid to keeping things running smoothly with the minimum of computer crashes, a small capacitor is often connected across motors.

Any ceramic capacitor between 30 and 100 nanofarads (nF) will do. These components are available from most electronics companies.

The parts for the circuit are available from the following sources:

ULN2003 – Rapid Electronics, Hill Farm Industrial Estate, Boxted, Colchester, Essex. CO4 5RD

DPDT Relays – From Tandy, Catalogue Number 275-215. Alternatively, any DPDT relay with the following characteristics: Coil resistance about 40 to 50 ohms, pull in voltage (the voltage across the coil needed to get it to switch from one position to another) three to four volts. Contact rating (the amount of current the relay switch contacts can pass without damage) one amp or more.

4k7 Resistors and 47nF Capacitors – these can be bought from Tandy or Rapid Electronics.

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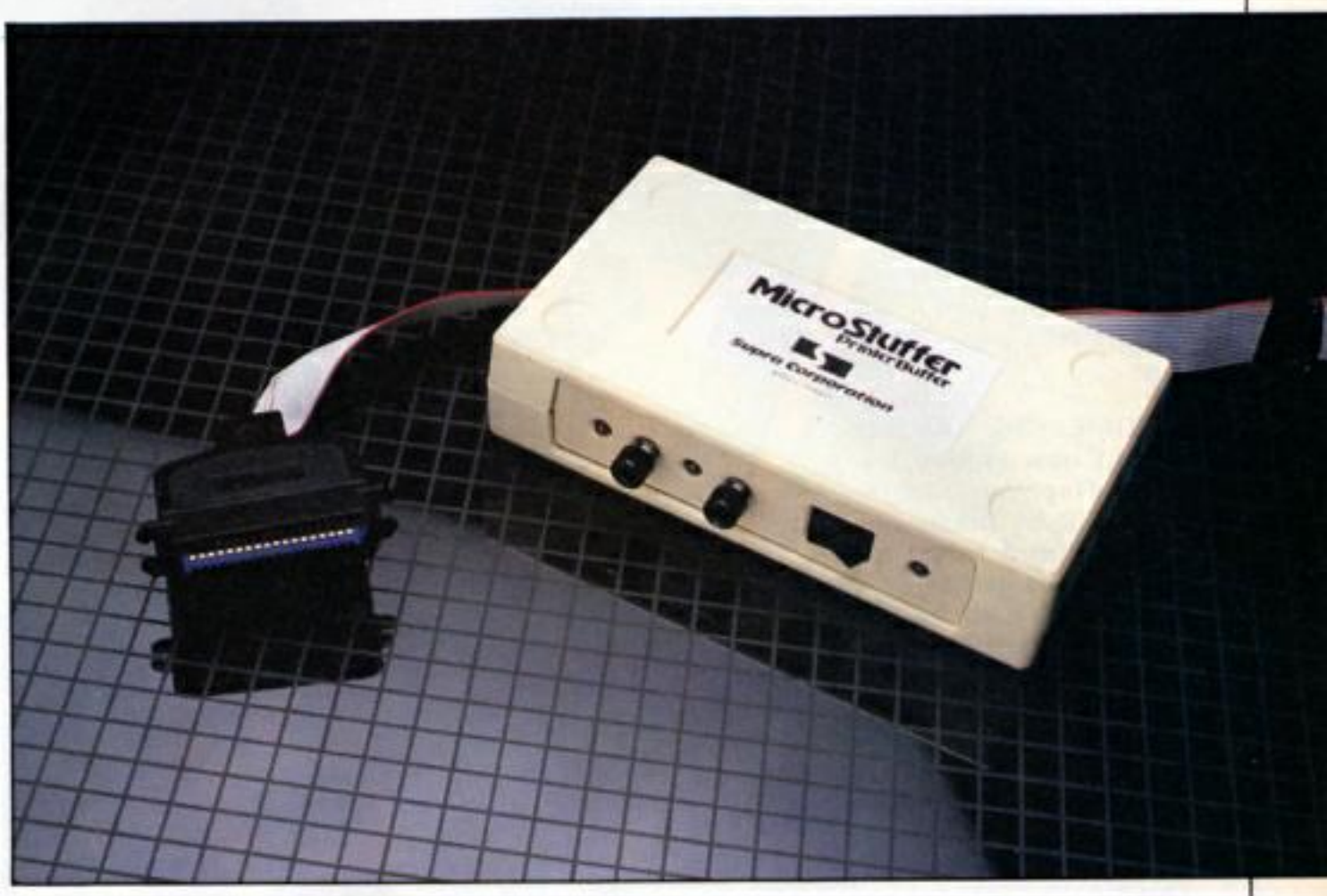

All good stuff...

ROLAND WADDILOVE assess a 64k printer buffer designed to increase your micro's efficiency

HAVE you ever sat twiddling your thumbs while waiting for the printer to produce a long document or listing? Well MicroStuffer is designed to avoid this holdup altogether by providing a massive 64k printer buffer.

One problem of using a computer with a printer is that they both run at different speeds.

Computers like the Electron, process information at quite a high speed, yet printers can only print the data provided by the micro relatively slowly. This forces the micro to reduce its speed to match that of the printer.

The effect of this is apparent when printing long documents or screen dumps – the micro is tied up for several minutes while the printer clatters away, preventing you from getting on with your work.

To make matters worse, the better the print quality, the slower the printer runs and the longer the micro is tied up.

This is why many printers, and even some software packages, have a draft and final quality print mode.

If you want a rough idea of what the document looks like on paper you use draft mode for speed. When everything is to your liking you use final quality – which may take up to twice as long to print, but the finished article is much more presentable.

A printer normally has a very small amount of ram on board, typically 1k or so, which it uses as a buffer. When it is empty a signal is sent to the micro telling it to send some text.

The micro sends characters until the printer signals the buffer is full and waits for it to print the text.

When the buffer is empty again the printer requests more text from the micro.

It sends this so quickly the buffer fills in no time at all and consequently spends most of its time waiting for the printer to empty it. This time is wasted as the micro can't be used for anything else.

The larger the printer's buffer the more text the micro can dump in it before it becomes full. If it is very large, say 64k as in the MicroStuffer, the whole of the text will easily fit in.

The micro dumps all the text in the buffer and you can start on your next task straight away.

The printer will print all the text in the buffer regardless of what the computer is doing (in fact you can even switch it off) so you can get on with the rest of your work.

So this is the idea behind the MicroStuffer – a large buffer is added between the computer and printer and the micro dumps all the output in it.

The printer prints while the micro is free to process the next document, screen dump or report.

The unit is small, unobtrusive and can be tucked away in a corner of the desk. It comes complete with its own power supply.

The socket on the back of the cream coloured case is identical to the one on the printer and this is where you plug in your printer lead. A short cable runs to a plug which fits into the printer's socket.

All you do is plug in, switch on and it's ready to go – it couldn't be simpler. In fact you won't notice it's there – except for the time saved.

There is an on/off switch plus two buttons on the front of the unit. One is a repeat button which reprints the contents of the buffer and the other is a panic button.

If you fill the buffer with text and suddenly discover an error you can hit the Clear button and flush it. You can't do this from the computer.

MicroStuffer isn't cheap, but if you find your time is being wasted waiting around for the printer it could improve your efficiency no end.

If you rarely use your printer it isn't necessary, but if you regularly print large documents it could repay itself in time saved very quickly.

It isn't micro-specific and will work with any computer and printer combination with Centronics type ports.

Product: MicroStuffer
Price: £49.95
Supplier: Supra Corporation, c/o Frontier Software, PO Box 113, Harrogate, North Yorkshire H92 OBE
Tel: 0423 67140

electron user ARCADE CORNER

WELCOME to Arcade Corner, a new regular feature in *Electron User* in which we'll be presenting hints, tips and maps for popular arcade games.

We also plan to include short listings providing peeks and pokes for infinite lives for your favourite software. These will put you in cheat mode for those awkward sections where you always seem to get zapped and lose a life.

This month, for those lost in Superior Software's arcade adventure game Ravenskull, Giles Morgan has drawn a superb map and key to Level 1.

This will enable you to plan your route through the maze, locate the objects you'll need in your quest and avoid the Ravenbees.

Share your tips, clues and pokes with fellow *Electron Users*, and if you have a problem and no one else can help, write to:

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Ravenskull
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SCROLL: TELEPORT TO
SCROLL: OPENS SIDE ENTRANCE TO CASTLE.
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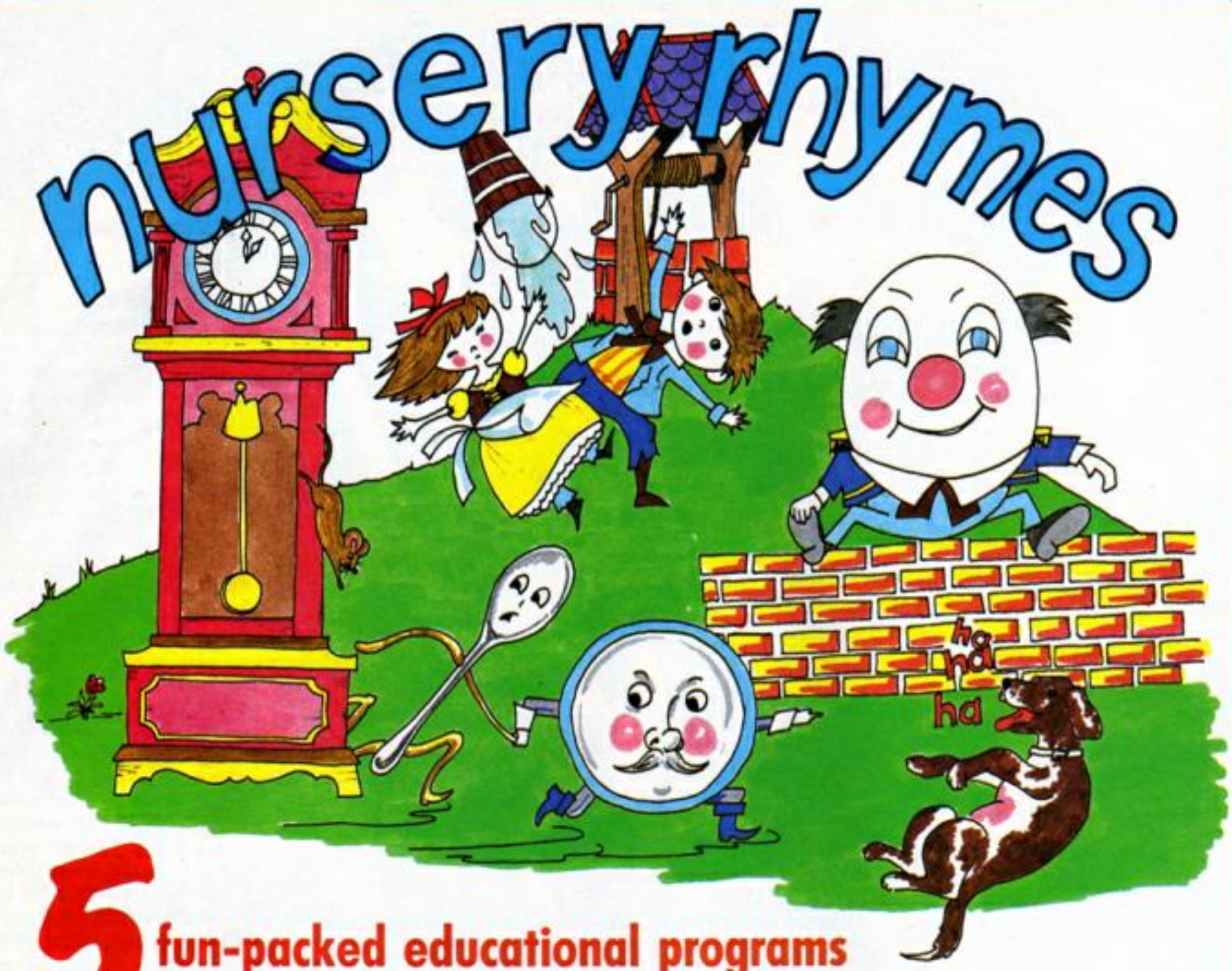
COFFIN.
PICK AXE.
SCROLL: KILLS WHEN USED.
DOOR.
WHEN CONTACTED, A SPIKE TRAP APPEARS AT *.
FIRST PART OF CRUCIFIX.
FLAG: REMEMBER, the Castle cannot be entered unless the green coloured scroll is used to open the side entrance.
N.B. Coloured keys open similar coloured spiked doors/doors.

nursery rhymes



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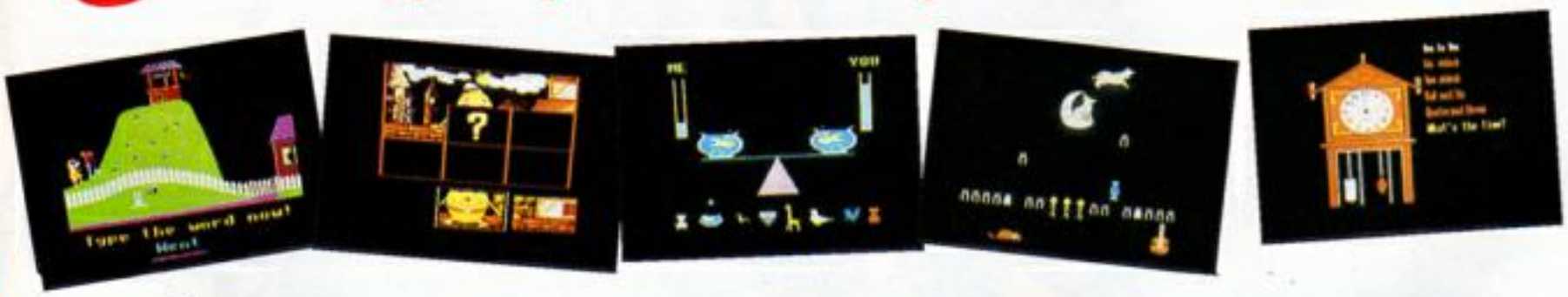

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Machine code maths

ROLAND WADDILOVE shows how to write floating point maths routines

ONE of the most complex tasks performed by BBC Basic is floating point maths. This is done entirely in machine code and at first sight appears very difficult to understand.

This isn't so, and in this article we'll see how floating point numbers are stored and look at the simplest mathematical operation – addition.

With a thorough grounding in the principals of floating point machine code we can write our own routines and include them in programs.

We can tailor them to our needs and optimise them for speed.

Let's start off by looking at simple integers and see how they are stored in binary. This should be familiar territory for most people.

Briefly, numbers in binary are made up by adding together powers of two. For instance:

	2^3	2^2	2^1	2^0
0 =	0	0	0	0
1 =	0	0	0	1
2 =	0	0	1	0
3 =	0	0	1	1
4 =	0	1	0	0
5 =	0	1	0	1

and so on. This is quite straightforward, so let's quickly move on.

Notice that each time, two is raised to a positive power – 1, 2, 3 and so on. Negative powers are equally valid, so what does 2^-1 or 2^-2 mean?

The minus sign simply means divide the power into one. For instance, 2^–1 means 1/2^1, 2^–2 is 1/2^2 and 2^–3 is 1/2^3.

When we work out these numbers they are in fact fractions. So 1/2 is 0.5 and 1/2^2 is 1/4, which is 0.25, and so on. Here are a few of these fractions:

		2^–1	2^–2	2 –3
0.5	=	1	0	0
0.25	=	0	1	0
0.125	=	0	0	1
0.75	=	1	1	0

By combining these fractions and the integer numbers we saw before we can make up any floating point number. For instance, 5 is 101 in binary and 0.25 is 01. So, 5.25 in binary is 101.01.

Figure I shows the number 3.75 written in floating point binary – 11.11.

An alternative way of expressing this number is similar to the decimal exponent notation.

For instance, 123.4 can be expressed as 1.234 x 10^2 or 1.234 E2. The E2 shows how many places to move the decimal point – two in this place

The binary floating point number 11.11 (3.75) can be expressed as 0.1111 E2. The E2 tells us that the decimal point is really two places to the right. The exponent is 2 or 10 in binary, and the number itself, the mantissa, is 1111.

The number can now be expressed as 10 1111, where the first number is the exponent and the second is the mantissa.

What we haven't allowed for in our floating point number scheme is negative values. How can we cope with these?

We can use the fact that the first digit of the mantissa of any binary number is always 1. Leading zeroes are never included in a number (we wouldn't normally write 27 decimal as 0027) so we can use the first digit as a sign bit.

If the first bit of the number is zero the number is positive and if it is one it is negative. So 3.75 is 10 0111. The exponent is 10 and the mantissa is 0111. Remember that the leading zero tells us the sign and is really a one.

So far so good, but what happens with very small floating point numbers? The exponent tells us how many places to the right we must move the decimal point, but what happens with 0.005?

This can be represented as 0.5 E–2, where the E–2 means move the decimal point two places to the left.

As we've seen we can represent 0.5 in binary quite easily, but how can we indicate that the decimal point is to be moved to the

Turn to Page 36 ▶

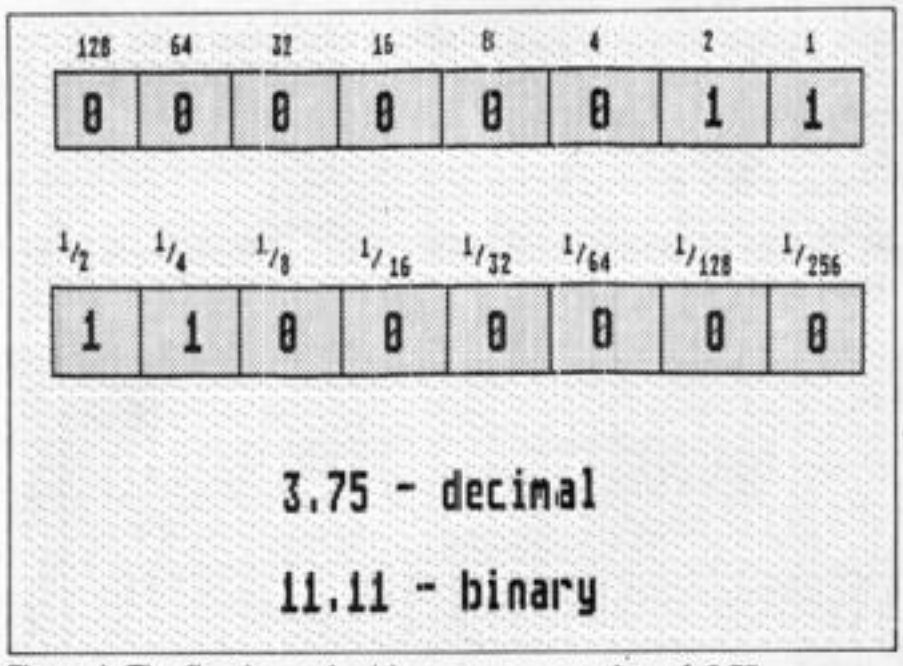

Figure I: The floating point binary representation of 3.75

Programming

◀ *From Page 35*

left?

This is achieved by adding an offset of &80 to the exponent. So &81 means move the decimal point one place to the right, &82 two places and so on, &7F is one place left, &7E two places and so on.

This means that 3.75 is 1111 with an exponent of &82.

Now we are in a position to look at how Basic handles these numbers. Enter and run Program I. You'll be asked to input a number. This will then be printed out in a packed and unpacked form.

The packed form is the one we've been discussing and is five bytes long. This is how Basic stores floating point numbers in variables.

When calculations are to be performed the number is expanded into eight bytes to increase the accuracy. This is the unpacked form.

The sign is taken into byte zero, the exponent becomes a two byte number and an extra byte is tagged on to the end of the mantissa.

Program II prompts for two numbers then adds them together, packs the result and then displays it.

```
IF exponents not equal THEN
For smaller exponent number
REPEAT
Shift mantissa one place right
Increment exponent
UNTIL exponents are equal
ENDIF
Add mantissas
IF carry THEN
Shift right into mantissa
Increment exponent
ENDIF
```

Figure II: The algorithm for floating point addition

Try entering 1.234 and 5.678 and check that the correct result is printed by adding them together in Basic. The algorithm used for this calculation is shown in Figure II.

The two numbers are passed as parameters in a CALL statement and the first part of the machine code unpacks them into &70 and &78.

The maths section performing the addition is labelled *add* and finally *done* packs the result into the variable *c*.

If you would like to try multiplication, here is a brief outline of the algorithm:

```
Multiply the mantissas
Add the exponents
WHILE msb<>1
Shift mantissa left
Decrement exponent
WEND
```

As you can see from Program II, the maths involved isn't all that difficult, just long winded and tedious.

Armed with these routines you should be able to develop your own machine code floating point maths package without too much difficulty. ■

```
  10 REM Floating Point
  20 REM By R.A.Waddilove
  30 REM (c) Electron User
  40 MODE 4
  50 INPUT"Number:"n
  60 addr=3+!(&400+2*ASC"n
") AND &FFFF
  70 PRINT"* PACKED *"
  80 PRINT"Exponent: "FNh
ex(?addr)" = "FNbin(?addr)
  90 PRINT"Mantissa:";
 100 FOR i=1 TO 4
 110 PRINT TAB(10)FNhex(ad
dr?i)" = "FNbin(addr?i)
 120 NEXT
 130 PRINT"* UNPACKED *"
 140 PRINT'TAB(4)"Sign: "F
Nhex(addr?1)" = "FNbin(addr
?1)
 150 PRINT"Exponent: 00 =
 00000000"
 160 PRINT TAB(10)FNhex(?a
ddr)" = "FNbin(?addr)
 170 PRINT"Mantissa: ";
 180 PRINT TAB(10)FNhex(ad
dr?1 OR &80);" = "FNbin(add
r?1 OR &80)
 190 FOR i=2 TO 4
 200 PRINT TAB(10)FNhex(ad
dr?i)" = "FNbin(addr?i)
 210 NEXT
 220 PRINT TAB(10)"00 = 00
000000"
 230 END
 240
 250 DEF PROCtitle(t$)
 260 COLOUR129:COLOUR0:PRI
NT" "t$" ":COLOUR128:COLOU
R1
 270 ENDPROC
 280
 290 DEF FNhex(b)
 300 =STR$~(b DIV16)+STR$~
(b MOD16)
 310
 320 DEF FNbin(b)
 330 FOR j=7 TO 0 STEP -1
 340 VDU 48-((b AND 2^j)>0
)
 350 NEXT
 360 ="
```

Program I

```
  10 REM Floating Point
  20 REM Machine Code
  30 REM By R.A.Waddilove
  40 REM (c) Electron User
  50 MODE 6
  60 PROCassemble
  70 INPUT"Number1:"a
  80 INPUT "Number2:"b
  90 c=0
 100 CALL &900,a,b,c
 110 PRINT "a+b=";c
 120 addr=3+!(&400+2*ASC"c
") AND &FFFF
 130 PRINT"* RESULT *"
 140 PRINT"Exponent: "FNh
ex(?addr)" = "FNbin(?addr)
 150 PRINT"Mantissa:";
 160 FOR i=1 TO 4
 170 PRINT TAB(10)FNhex(ad
dr?i)" = "FNbin(addr?i)
 180 NEXT
 190 END
 200
 210 DEF PROCtitle(t$)
 220 COLOUR129:COLOUR0:PRI
NT" "t$" ":COLOUR128:COLOU
R1
 230 ENDPROC
 240
 250 DEF FNhex(b)
 260 =STR$~(b DIV16)+STR$~
(b MOD16)
 270
 280 DEF FNbin(b)
 290 FOR j=7 TO 0 STEP -1
 300 VDU 48-((b AND 2^j)>0
)
 310 NEXT
 320 ="
 330
 340 DEF PROCassemble
 350 block=&600
 360 FPA=&70:FPB=&78
 370 num1=&80:num2=&82:num
3=&84
 380 FOR pass=0 TO 2 STEP
2
 390 P%=&900
 400 [OPT pass
 410 LDA block+1:STA num1:
LDA block+2:STA num1+1 \add
ress of a
 420 LDA block+4:STA num2:
LDA block+5:STA num2+1 \add
ress of b
 430 LDA block+7:STA num3:
LDA block+8:STA num3+1 \add
ress of c
 440 LDY #4
 450 .loop
 460 LDA (num1),Y:STA FPA+
2,Y \a --> FPA
 470 LDA (num2),Y:STA FPB+
2,Y \b --> FPB
 480 DEY:BPL loop
 490 INY
 500 STY FPA+1:STY FPA+7
 510 STY FPB+1:STY FPB+7
 520 INY
 530 LDA FPA+3:STA FPA \si
gn of a
 540 ORA #&80:STA FPA+3 \s
et msb a
 550 LDA FPB+3:STA FPB \si
gn of b
 560 ORA #&80:STA FPB+3 \s
et msb b
 570
 580 .add
 590 LDA FPB+2:CMP FPA+2:B
EQ equal:BCS here
 600 LSR FPB+3:ROR FPB+4:R
OR FPB+5:ROR FPB+6:ROR FPB+
7
 610 INC FPB+2:BNE add
 620 .here
 630 LSR FPA+3:ROR FPA+4:R
OR FPA+5:ROR FPA+6:ROR FPA+
7
 640 INC FPA+2:BNE add
 650 .equal
 660 CLC
 670 LDX #4
 680 .loop
 690 LDA FPA+3,X:ADC FPB+3
,X:STA FPA+3,X
 700 DEX:BPL loop
 710 BCC done
 720 ROR FPA+3:ROR FPA+4:R
OR FPA+5:ROR FPA+6:ROR FPA+
7
 730 INC FPA+2
 740
 750 .done
 760 ASL FPA+3:ASL FPA:ROR
 FPA+3 \sign
 770 LDY #4
 780 .loop
 790 LDA FPA+2,Y:STA (num3
),Y \pack result in c
 800 DEY:BPL loop
 810 RTS
 820 ]
 830 NEXT
 840 ENDPROC
```

Program II

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TO ORDER TURN TO THE FORM ON PAGE 49

No cutting corners on Crazee Rider

Ever wondered how top-selling arcade games are written? KEVIN EDWARDS reveals all

AFTER completing the BBC and Electron versions of the shoot-'em-up game Galaforce, Superior Software asked me if I was interested in writing a car racing game for the Electron.

This was intended to be a follow up to Superior's best seller, Overdrive, a car racing game which, while being exciting, didn't have any corners.

I was very interested and began work in Autumn 1986. The big question was whether the Electron was fast enough to cope with realistically moving corners.

First, I decided that the game would have to be written in Mode 5. There are several reasons for this. First, the ULA slows down the Electron in screen modes 0 to 3 and since speed is crucial I had to forget the ideally suited Mode 2.

Second, the game was to have excellent graphics and several tracks so the screen had to take up as little memory as possible. This left a choice of Mode 4 or 5.

As colour was essential I had no alternative but to choose Mode 5.

The next problem was to find a way of updating and moving the road as fast and smoothly as possible. At first a dual screen technique was considered. This requires two copies of the screen.

While one image is shown the other – in a separate block of memory – is updated. Once the off-screen image is completed it is used as the show screen. This is achieved by altering the screen memory start register in the ULA.

Swapping between two screen images greatly reduces flicker, but having two copies of the screen gobbles up too much memory. Back to the drawing board.

In the end I decided to update just the edge of the kerbing instead of re-drawing all the road and grass area. This must, of course, be done on both sides of the road.

A modified line draw routine is used to create the curved road edge. When a corner is entered or exited the new kerb edge is calculated so that the program can change just the parts that have moved.

So if a section of kerb moves one pixel right the routine can intelligently redraw the kerb one pixel to the right. This is much quicker that redrawing the entire row which has moved.

Only the left kerb edge need be calculated as the right edge is always a constant distance away. A look-up table containing the offset is added to the left edge to give the required right edge position.

Also, when you go round a corner the mountains in the distance must be scrolled in the correct direction. This is done by redrawing them two pixels to the left or right of their last position.

The impression of speed is achieved by altering the colour of the kerb edge, which is made up of red and white blocks. The faster you go the faster the kerb blocks change between red and white.

In Overdrive, which was written in Mode 2, a simple palette switching technique using VDU 19 was used to animate the kerbing. For this, two (or more) colours must be set aside for the kerbing. If they are not, any graphics using the kerb colours would also flash.

As the game is in Mode 5 – a four colour mode – dedicating two colours to the kerb would leave only two colours for the other graphics – one of which must be black for the background.

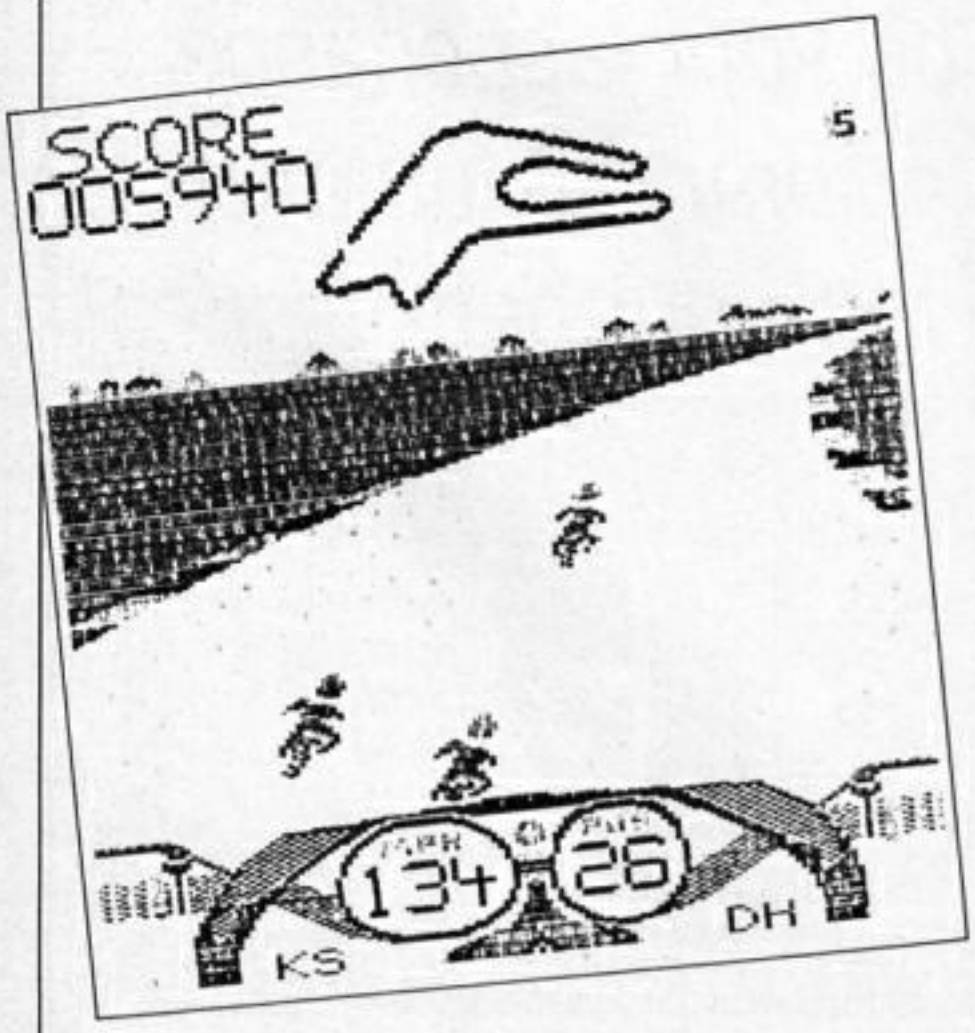
Palette switching would be too restricting so the kerbing is redrawn in its new colour each time it moves. This takes a long time as both sides of the road must be altered at the same time to make the movement smooth and accurate.

A lot of work went into the kerb and road updating routine to make it as fast as possible.

By the time this had been completed Superior and I decided that a motorcycle racing game would be more original than the rather dated car theme. Also, the game now became an Electron and BBC project.

The next problem was how to move bikes up and down the road area. Sounds easy, but it requires a bit of extra thought since the other bikes must go round corners, lean in the correct way and avoid going too close to the kerb.

In addition they must try not to crash into the back of



the bike in front, move realistically relative to your speed, decrease and increase in size depending on their direction and generally behave in a sensible way.

To save processor time a slightly modified fast sprite routine from my last Electron game, Galaforce was used to draw them.

As Crazee Rider is intended to be a fun game rather than a simulation another feature was needed to emphasise the point.

Partly due to the very generous collision detection routine I had written it was decided that it would be fun if you could knock other riders out of the way by ramming into the side of them, which would gain bonus points.

After a little tinkering this was added and it became just as much fun hitting other bikes out of the way as racing round the tracks.

This was soon followed by a graphical hit count tally system in the top right corner of the screen. Symbols corresponding to 1, 5, 10 and 50 hits show how many bikes have been knocked out of the way.

A countdown bonus system at the end of each circuit awards 200 points for each hit.

At this stage many other things had been added such as the score, handle bar control panel area and a new six by eight pixel character font which allows more characters to be displayed on each row.

The handlebars at the bottom of the screen now contained indicators showing the rider's current speed and position in the race.

The very early versions of Crazee Rider displayed road signs at the top of the screen discribing what was ahead on the road, such as a left or right corner or straight.

This was a nice feature, but it was hard to visualise what the circuit looked like so a miniature map idea, similar to that used in Superior's BBC Grand Prix Construction set, was used instead.

This shows the whole of the circuit including markers for the start/finish line and the rider's position. Thus at a glance you can see how much further there is to go and what is ahead. Appropriate action can be taken to avoid taking corners too fast for instance.

By now the game plan had been finalised. You compete against 59 other riders in races at several famous circuits. You must try to finish the race in one of the first six positions – easier said than done. If you do, you compete in the next race at a new circuit.

As you progress through the tracks the skill of the other riders improves and eventually a single mistake can cost you the race.

Next, the race start sequence was given a face lift. Start lights, other riders beside the player and revving noises were added to give the game more realism.

Several tunes and sound effects were included such as engine, skidding, crashing and bumping noises.

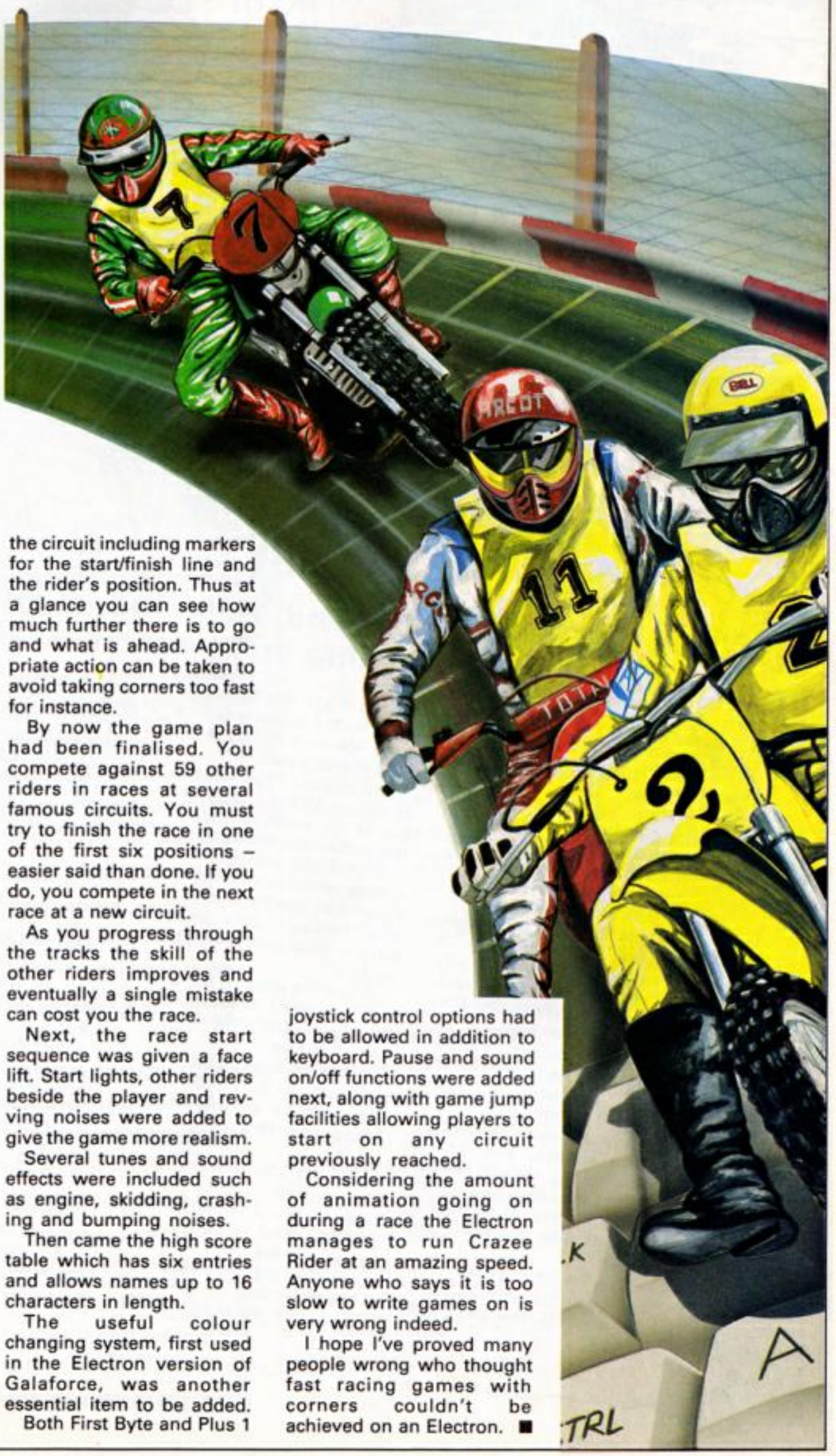
Then came the high score table which has six entries and allows names up to 16 characters in length.

The useful colour changing system, first used in the Electron version of Galaforce, was another essential item to be added.

Both First Byte and Plus 1 joystick control options had to be allowed in addition to keyboard. Pause and sound on/off functions were added next, along with game jump facilities allowing players to start on any circuit previously reached.

Considering the amount of animation going on during a race the Electron manages to run Crazee Rider at an amazing speed. Anyone who says it is too slow to write games on is very wrong indeed.

I hope I've proved many people wrong who thought fast racing games with corners couldn't be achieved on an Electron. ■



MR. MINER

MARK BOLTON and ALISTAIR KING present a puzzling arcade adventure

A WICKED old pirate by the name of Captain Ethelpink Blacktooth comes ashore at Whitby.

He's an old man, no longer fit to plunder the high seas, and wants to hide his treasure in the chalky hills. But one day he vanishes without trace.

Over the years, rumours of vast caves filled with treasure become rife locally. A few brave souls enter the labyrinth, but they are never seen again.

This happened almost 400 years ago, and in the 20th century no one believes a word of it.

As a treasure hunter of some repute, you make your living investigating such legends, and after many nights of research you decide to test the caves.

One misty dawn you approach the entrance with visions of jewels and pirate booty.

Behind you the taunts of disbelieving locals fade as a huge stone is rolled away from the entrance.

The object of the game is to collect all the jewels, dig out all the earth and kill all the poisonous mushrooms.

This is not a simple as it seems, many have tried and failed and you have to journey through five caves before you can leave the system.

When the game is run you will be asked to enter the keys to control your character, Mr Miner.

Any keys may be defined, although S, Q, Escape and Break have special functions and should not be used.

To get you started here are a few hints: Rocks always fall if unsupported. If they land on a gem or another rock they will roll off left or right if possible.

Rocks must be dropped onto the mushrooms to squash them. You cannot push rocks into mushrooms.

While entering the listing you should be careful not to mix similar characters like Is and 1s and not enter extra spaces.

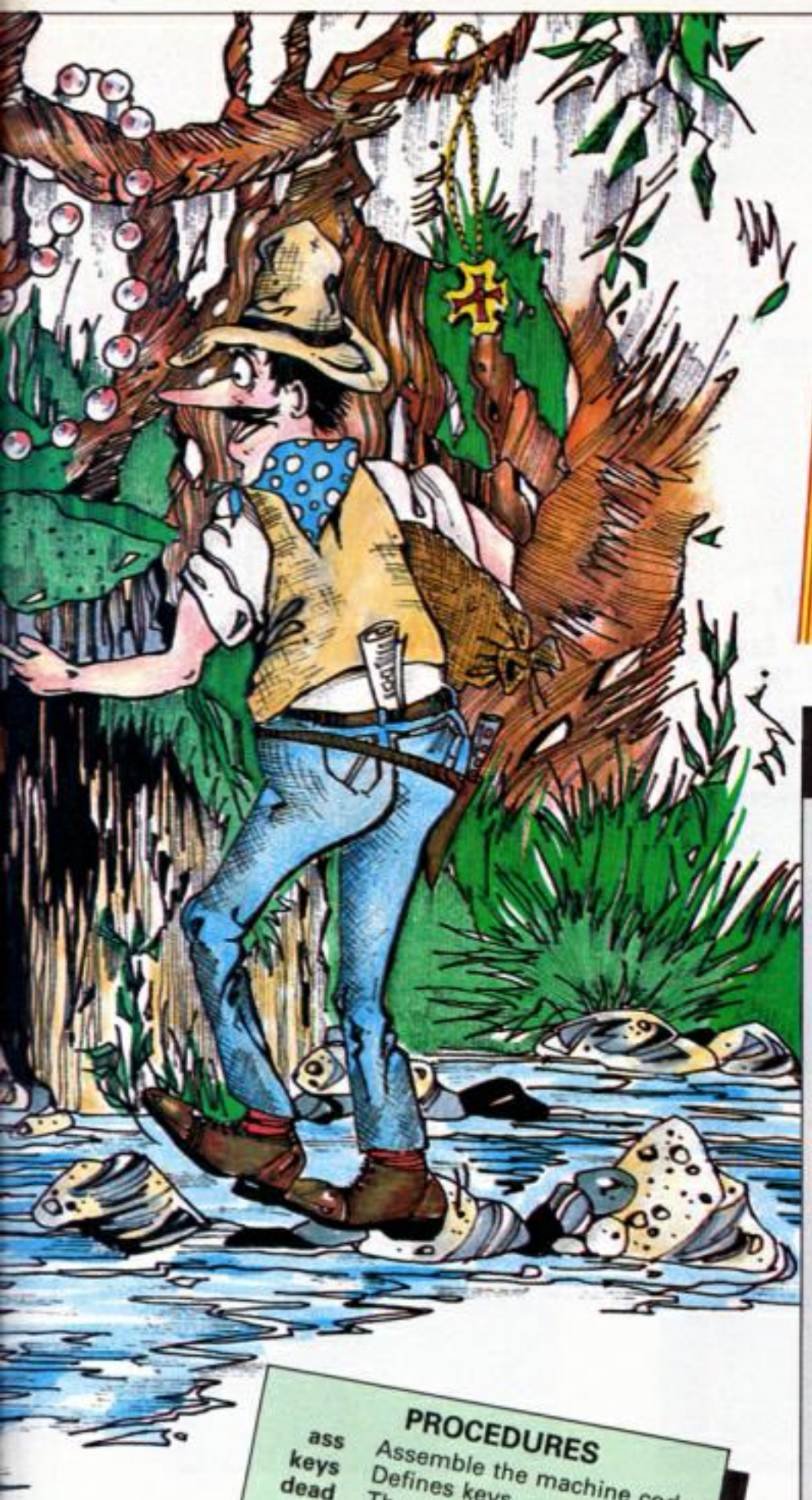
The space between the line number and the start of the line has been included for clarity and should not be entered.

It is vital to save the program before running it, as parts of the program are deleted automatically on running it.

Also a typing error in the machine code could cause an irretrievable crash.

Plus 3 users should note that the program downloads itself to E00 and will be corrupted if Break is pressed.

Finally, line 90 should be left out until you are sure you haven't made any typing errors, or the Escape key will be disabled.



PROCEDURES

ass	Assemble the machine code.
keys	Defines keys.
dead	The death routine.
rleft	Move rock left.
left	Move man left.
lev	Go to next level.
check	Check for various events.

VARIABLES

sc%	Current score.
lev%	Screen level.
di%	Diamonds collected.
ea%	Earth collected.
sq%	Mushrooms squashed.

CONTROLS

S	Sound effects on.
Q	Sound effects off.
Escape	Lose a life.
Break	Return to Basic.

Mr Miner listing

```
   10 REM Mr.Miner
   20 REM By Mark Bolton an
d Alistair King
   30 REM (c) Electron User
   40 :
   50 IFPAGE=&E00 THEN60 EL
SE2050
   60 MODE5:PROCinst:HIMEM=
&4C00:GOTO100
   70 MODE6:VDU23,1,0;0;0;0
;:PROCkeys
   80 MODE5:VDU23,1,0;0;0;0
;19,3,2;0;:HIMEM=&4C00
   90 *FX229,1
  100 RESTORE1900:PROCchars
:PROCass
  110 *K.0 DEL.50,60|MDEL.1
00,130|MRUN|M
  120 *FX138,0,128
  130 END
  140 ?&358=90:CLS:?&358=0:
VDU24,32;16;1247;208;16,24,
32;920;1247;994;16,26
  150 PRINTTAB(1,1)"Score"T
AB(2,26)"Diamonds:"TAB(5,28
)"Earth:"TAB(1,30)"Mushroom
s:"
  160 RESTORE2150:PROCinit:
PROCframe:PROCscore:PROCliv
es
  170 PROClev:IFlev%=6 OSCL
I"FX14,4":CLS:PROCend:REPEA
TUNTILINKEY-99:OSCLI"FX13,4
":RUN ELSEPROCload
  180 D%=&4F9F+MY%*24+MX%:s
d%=D%:smx%=MX%:smy%=MY%
  190 SOUND1,3,0,9:REPEATPR
OClives:REPEAT
  200 CALLR%:!data=D%:!addr
=&6390:CALLS%
  210 PRINTTAB(11,26);maxdi
%-di%;SPC(3);TAB(11,28);max
ea%-ea%;SPC(3);TAB(11,30);m
axsq%-sq%;SPC(3)
  220 PROCcheck:IFNOTdead P
ROCmove
  230 IFkt% cn%=cn%+1:IFcn%
=5 PROCki
  240 UNTILdead ORend
  250 !data=D%:!addr=&6390:
CALLS%
  260 IFend THEN310
  270 dead=0:MX%=smx%:MY%=s
my%:D%=sd%
  280 PROCS(MX%,MY%,230)
  290 PROCd(100)
  300 OSCLI"FX15":PROCd(70)
  310 UNTILI%=0 ORend
  320 IFend PROCyay:ea%=0:s
q%=0:di%=0:maxdi%=0:maxsq%=
0:maxea%=0:dead=0:end=0:GOT
O170
  330 PROClives:!data=&5700
:!addr=&6390:CALLS%:VDU5:MO
VE375,552:PRINT"Game Over"
  340 MOVE 375,432:PRINT"Hi
t Space";:PROCs:REPEATUNTIL
INKEY-99:VDU4:PROCq
  350 GOTO160
  360 END
  370 DEFPROCass
  380 addr=&76:data=&7A
  390 xc=&74:yc=&75
  400 kd=&7E:sqd=&7F:fell=&
8A
  410 FORI%=0TO2STEP2
  420 P%=&5400:[OPTI%
  430 .S%
  440 LDA#0:STAxc:STAyc
  450 LDY#0:.loop LDA(data)
,Y
  460 CMP#224:BNEl2:JMPbloc
k
  470 .l2 CMP#225:BNEl3:JMP
rock
  480 .l3 CMP#226:BNEl4:JMP
dia
  490 .l4 CMP#227:BNEl5:JMP
mush
  500 .l5 CMP#228:BNEl6:JMP
earth
  510 .l6 CMP#229:BNEl7:JMP
space
  520 .l7 CMP#230:BNEl8:JMP
man
  530 .l8 CMP#231:BNEl9:JMP
safe
  540 .l9 CMP#232:BNEl0:JMP
fkey
  550 .l0 CMP#233:BNEl1:JMP
key
  560 .l1
```

Turn to Page 43 ▶

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Mouser
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Seawall
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NUMBER SIGNS
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BALANCE
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Ages 8-12

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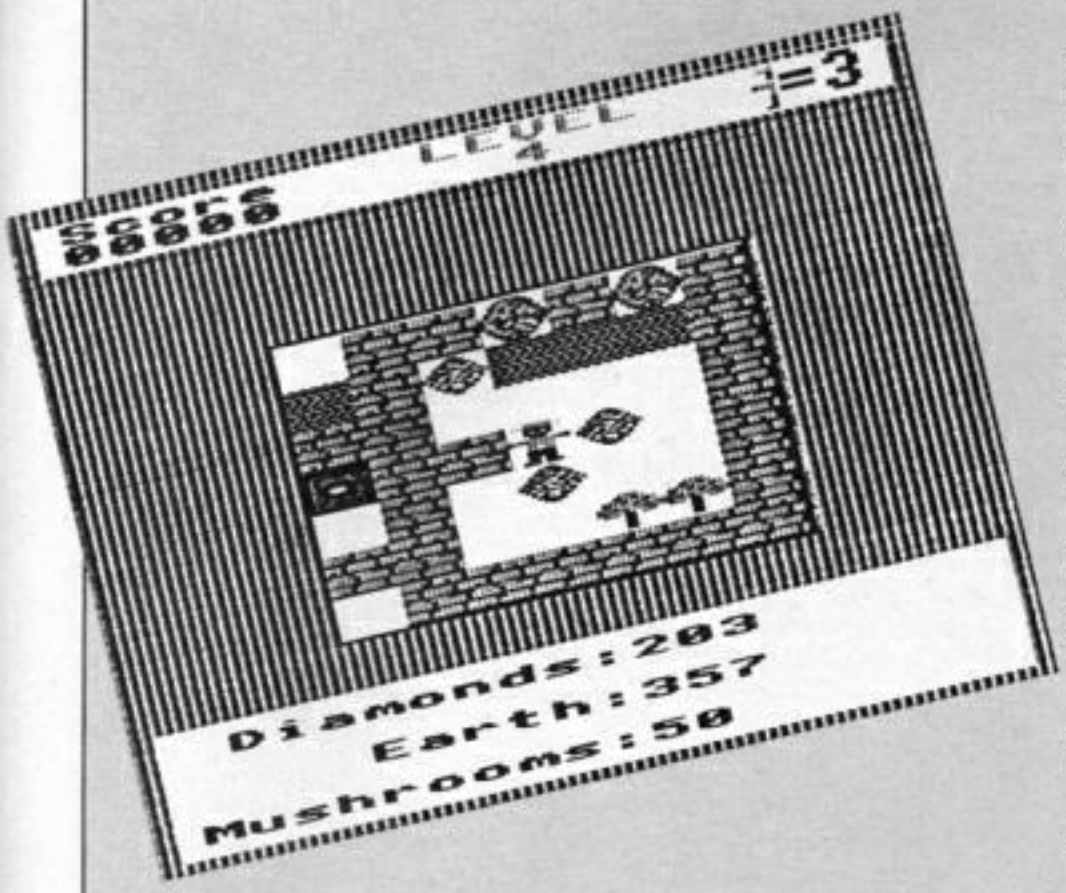
Dog Duck Corn
Guessing
Hangman
Maths Hike
Nim
Odd Man Out
Pelmanism
Towers of Hanoi

HANGMAN
Improve your child's spelling with this fun version of the popular game

ODD MAN OUT
Find the word that does not fit – before your time runs out

TO ORDER TURN TO THE FORM ON PAGE 53

Mr Miner listing



◀ From Page 41

```
  570 .next LDA#1:JSRadd:LD
A#24:JSRADD:INCxc:LDAxc:CMP
#7:BEQ next2:JMPloop
  580 .next2 LDA#17:JSRadd:
LDA#236:JSRADD:LDA#236:JSRA
DD:LDA#0:STAxc:INCyc:LDAyc:
CMP#7:BEQ end:JMPloop
  590 .end RTS
  600 .add STA&90:CLC:LDAda
ta:ADC&90:STAdata:LDAdata+1
:ADC#0:STAdata+1:RTS
  610 .ADD STA&90:CLC:LDAad
dr:ADC&90:STAaddr:LDAaddr+1
:ADC#0:STAaddr+1:RTS
  620 .SUB STA&90:SEC:LDAad
dr:SBC&90:STAaddr:LDAaddr+1
:SBC#0:STAaddr+1:RTS
  630 .print LDY#&17:.p2 LD
A(&80),Y:STA(addr),Y:DEY:BP
Lp2
  640 LDA#160:JSRADD:LDA#16
0:JSRADD
  650 CLC:LDA&80:ADC#24:STA
&80:LDA&81:ADC#0:STA&81
  660 LDY#&17:.p3 LDA(&80),
Y:STA(addr),Y:DEY:BPLp3
  670 LDA#160:JSRSUB:LDA#16
0:JSRSUB
  680 LDY#0:RTS
  690 .block LDA#&0:STA&80:
LDA#&4C:STA&81:JSRprint:JMP
next
  700 .rock LDA#&30:STA&80:
LDA#&4C:STA&81:JSRprint:JMP
next
  710 .dia LDA#&60:STA&80:L
DA#&4C:STA&81:JSRprint:JMPn
ext
  720 .mush LDA#&90:STA&80:
LDA#&4C:STA&81:JSRprint:JMP
next
  730 .earth LDA#&C0:STA&80
:LDA#&4C:STA&81:JSRprint:JM
Pnext
  740 .space LDA#&F0:STA&80
:LDA#&4C:STA&81:JSRprint:JM
Pnext
  750 .man LDA#&20:STA&80:L
DA#&4D:STA&81:JSRprint:JMPn
ext
  760 .safe LDA#&50:STA&80:
LDA#&4D:STA&81:JSRprint:JMP
next
  770 .fkey LDA#&80:STA&80:
LDA#&4D:STA&81:JSRprint:JMP
next
  780 .key LDA#&B0:STA&80:L
DA#&4D:STA&81:JSRprint:JMPn
ext
  790 .R%
  800 LDA#0:STAsqd:STAkd:ST
Afell
  810 LDA#&52:STAdata+1:LDA
#&88:STAdata
  820 .lop LDY#1:LDA(data),
Y:CMP#225:BEQcheck
  830 .next SEC:LDAdata:SBC
#1:STAdata:LDAdata+1:SBC#0:
STAdata+1
  840 LDAdata:CMP#&48:BEQ n
2:JMPlop
  850 .n2 LDAdata+1:CMP#&50
:BEQ end2:JMPlop
  860 .end2 RTS
  870 .check
  880 LDY#25:LDA(data),Y:CM
P#227:BNEc2:JMPmh
  890 .c2 CMP#229:BNE C:JMP
fall
  900 .C LDY#24:LDA(data),Y
:CMP#229:BNEE
  910 LDY#0:LDA(data),Y:CMP
#229:BNEE:JMPfll
  920 .E LDY#26:LDA(data),Y
:CMP#229:BNEeck
  930 LDY#2:LDA(data),Y:CMP
#229:BNEeck:JMPfrg
  940 .eck JMPnext
  950 .fall LDA#225:STA(dat
a),Y:LDY#1:LDA#229:STA(data
),Y:LDA#255:STAfell:LDY#49:
LDA(data),Y:CMP#230:BEQdead
:JMPnext
  960 .mh LDA#255:STAsqd:JM
Pfall
  970 .dead LDA#255:STAkd:J
MPnext
  980 .fll LDY#25:LDA(data)
,Y:CMP#226:BEQfl2:CMP#225:B
EQfl2:JMPnext
  990 .fl2 LDY#24:LDA#225:S
TA(data),Y:LDY#1:LDA#229:ST
A(data),Y:LDA#255:STAfell:L
DY#48:LDA(data),Y:CMP#230:B
EQdead:JMPnext
 1000 .frg LDY#25:LDA(data)
,Y:CMP#226:BEQfr2:CMP#225:B
EQfr2:JMPnext
 1010 .fr2 LDY#26:LDA#225:S
TA(data),Y:LDY#1:LDA#229:ST
A(data),Y:LDA#255:STAfell:L
DY#50:LDA(data),Y:CMP#230:B
EQdead:JMPnext
 1020 .T% LDA#&52:STAdata+1
:LDA#&A2:STAdata:LDY#0:.slo
p
 1030 LDA(data),Y:CMP#231:B
EQ change
 1040 .sn SEC:LDAdata:SBC#1
:STAdata:LDAdata+1:SBC#0:ST
Adata+1:LDAdata:CMP#&48:BEQ
 sn2:JMPslop
 1050 .sn2 LDAdata+1:CMP#&5
0:BEQ send:JMPslop
 1060 .send RTS
 1070 .change LDA#226:STA(d
ata),Y:JMPsn
 1080 ]:NEXT
 1090 ENVELOPE2,2,17,-6,23,
17,28,2,126,0,0,-126,126,12
6:ENVELOPE1,4,5,6,7,8,9,10,
126,0,0,-126,126,126:ENVELO
PE3,2,2,0,0,100,0,0,126,0,0
,-126,126,126
 1100 ENDPROC
 1110 DEFPROCki:IF?key%=232
 ?key%=233:cn%=0:ENDPROC
 1120 IF?key%=233 ?key%=232
:cn%=0:ENDPROC
 1130 cn%=0:kt%=0:ENDPROC
 1140 DEFFNS(x%,y%)=?(&4FEA
+y%*24+x%)
 1150 DEFPROCS(x%,y%,v%):?(
&4FEA+y%*24+x%)=v%:ENDPROC
 1160 DEFPROCmove
 1170 IFINKEY-(?&9A)PROClef
t:ENDPROC
 1180 IFINKEY-(?&9B)PROCrig
ht:ENDPROC
 1190 IFINKEY-(?&9C)PROCup:
ENDPROC
 1200 IFINKEY-(?&9D)PROCdow
n:ENDPROC
 1210 IFINKEY-113 U%=D%:PRO
Cdead(MX%,MY%)
 1220 IFINKEY-17 OSCLI"FX15
":OSCLI"FX210,1"
 1230 IFINKEY-82 OSCLI"FX21
0"
 1240 ENDPROC
 1250 DEFPROCleft:L%=FNS(MX
%-1,MY%):IFL%=224 ORL%=231
ENDPROC
 1260 IFL%=225 PROCrleft:IF
no% ENDPROC
 1270 IFL%=227 U%=D%-1:PROC
dead(MX%-1,MY%):ENDPROC
 1280 IFL%=226 PROCdia ELSE
IFL%=228 PROCearth ELSEIFL%
>231 PROCstd
 1290 PROCS(MX%,MY%,229):D%
=D%-1:MX%=MX%-1:PROCS(MX%,M
Y%,230):ENDPROC
 1300 DEFPROCright:L%=FNS(M
X%+1,MY%):IFL%=224 ORL%=231
 ENDPROC
 1310 IFL%=225 PROCrright:I
fno% ENDPROC
 1320 IFL%=227 U%=D%+1:PROC
dead(MX%+1,MY%):ENDPROC
 1330 IFL%=226 PROCdia ELSE
IFL%=228 PROCearth ELSEIFL%
>231 PROCstd
 1340 PROCS(MX%,MY%,229):D%
=D%+1:MX%=MX%+1:PROCS(MX%,M
Y%,230):ENDPROC
 1350 DEFPROCup:L%=FNS(MX%,
MY%-1):IFL%=224 ORL%=231 EN
DPROC
 1360 IFL%=225 ENDPROC ELSE
IFL%=227 U%=D%-24:PROCdead(
MX%,MY%-1):ENDPROC
 1370 IFL%=226 PROCdia ELSE
IFL%=228 PROCearth ELSEIFL%
>231 PROCstd
 1380 PROCS(MX%,MY%,229):D%
=D%-24:MY%=MY%-1:PROCS(MX%,
MY%,230):ENDPROC
 1390 DEFPROCdown:L%=FNS(MX
%,MY%+1):IFL%=224 ORL%=231
ENDPROC
 1400 IFL%=225 ENDPROC ELSE
IFL%=227 U%=D%+24:PROCdead(
MX%,MY%+1):ENDPROC
 1410 IFL%=226 PROCdia ELSE
IFL%=228 PROCearth ELSEIFL%
>231 PROCstd
 1420 PROCS(MX%,MY%,229):D%
=D%+24:MY%=MY%+1:PROCS(MX%,
MY%,230):ENDPROC
 1430 DEFPROCstd:CALLT%:SOU
ND&11,2,150,3:ENDPROC
 1440 DEFPROCrleft:no%=0:IF
FNS(MX%-2,MY%)<>229 no%=TRU
E:ENDPROC
 1450 PROCS(MX%-2,MY%,225):
PROCS(MX%-1,MY%,229):SOUND&
10,-15,6,2:ENDPROC
 1460 DEFPROCrright:no%=0:I
FFNS(MX%+2,MY%)<>229 no%=TR
UE:ENDPROC
 1470 PROCS(MX%+2,MY%,225):
PROCS(MX%+1,MY%,229):SOUND&
10,-15,6,2:ENDPROC
 1480 DEFPROCload:Q%=&5048:
PROCs
 1490 FORY%=4TO28:?Q%=224:Q
%?1=224:Q%?2=224:Q%=Q%+3:RE
ADA$
 1500 FORX%=1TO18:B%=159+AS
CMID$(A$,X%,1)
 1510 IFB%<224 B%=229
 1520 ?Q%=B%:Q%=Q%+1
 1530 IFB%=231 ORB%=226 max
di%=maxdi%+1
 1540 IFB%=227 maxsq%=maxsq
%+1
 1550 IFB%=228 maxea%=maxea
%+1
 1560 IFB%=230 MX%=X%:MY%=Y
%
 1570 IFB%=232 key%=Q%-1:kt
%=TRUE
 1580 NEXT
 1590 ?Q%=224:Q%?1=224:Q%?2
=224:Q%=Q%+3
 1600 NEXT:Iflev%=2 sq%=sq%
+1
 1610 PROCq:ENDPROC
 1620 DEFPROCearth:ea%=ea%+
1:SC%=SC%+RND(3)+1:COLOUR2:
PROCscore:ENDPROC
 1630 DEFPROCdia:SC%=SC%+10
:SOUND&11,1,160,2:di%=di%+1
:PROCscore:ENDPROC
 1640 DEFPROCscore:COLOUR3:
PRINTTAB(1,2);RIGHT$("0000"
+STR$SC%,5):ENDPROC
```

Turn to Page 44 ▶

Mr Miner listing

◀ From Page 43

```
 1650 DEFPROCframe:VDU24,316;284;992;742;16,26:MOVE316,742:DRAW316,284:DRAW992,284:DRAW992,742:DRAW324,742:ENDPROC
 1660 DEFPROCdead(x%,y%):PROCS(MX%,MY%,229):MX%=x%:MY%=y%:D%=U%:V%=FNS(MX%,MY%):PROCS(MX%,MY%,230):SOUND&10,-15,4,15
 1670 FORI%=1TO5:!data=D%:!addr=&6390:CALLS%:PROCS(MX%,MY%,V%):!data=D%:!addr=&6390:CALLS%:PROCS(MX%,MY%,230):NEXT:PROCS(MX%,MY%,V%):*FX15
 1680 dead=TRUE:LI%=LI%-1:ENDPROC
 1690 DEFPROClives:COLOUR3:A%=&4D20:B%=&5A48:PROCk:A$="="+STR$LI%:A%=&A:X%=0:Y%=&A:D=&A00:FORJ%=1TOLENA$
 1700 ?D=ASC(MID$(A$,J%,1)):CALL&FFF1:VDU23,224,D?1,D?1,D?2,D?2,D?3,D?3,D?4,D?4,23,225,D?5,D?5,D?6,D?6,D?7,D?7,D?8,D?8:PRINTTAB(16+J%,1);CHR$224;CHR$10;CHR$8;CHR$225;:NEXT:ENDPROC
 1710 DEFPROClev:lev%=lev%+1:!data=&5700:!addr=&6390:CALLS%:VDU5:MOVE407,520:PRINT"Thinking":VDU4,17,1:PRINTTAB(9,1);"LEVEL";TAB(11,2);lev%:ENDPROC
 1720 DEFPROCinit:lev%=0:SC%=0:LI%=3:ea%=0:sq%=0:di%=0:maxdi%=0:maxsq%=0:maxea%=0
 1730 FORI%=&5000TO&53FFSTEP4:!I%=&E0E0E0E0:NEXT:FORI%=&5700TO&57FF STEP4:!I%=&E5E5E5E5:NEXT
 1740 kt%=0:end=0:dead=0:data=&7A:addr=&76:ENDPROC
 1750 DEFPROCd(n):TIME=0:REPEATUNTILTIME>n:ENDPROC
 1760 DEFPROCcheck
 1770 IF?&8A SOUND&10,-15,6,2
 1780 IF?&7E U%=D%:PROCdead(MX%,MY%)
 1790 IF?&7F sq%=sq%+1:SOUND0,-15,4,1
 1800 IFsq%=maxsq% ANDea%=maxea% ANDdi%=maxdi% end=TRUE
 1810 ENDPROC
 1820 DEFPROCkeys:PRINT"Mr Miner":VDU23,224,-1,-1,0,0,0,0,0,0:PRINTSTRING$(8,CHR$224):k%=&9A:RESTORE1850:FORI%=0TO3:READA$:PRINT"Press the key you wish to use for ";A$
 1830 F%=0:REPEATFORi%=123TO1STEP-1:IFINKEY-i% F%=i%
 1840 NEXT:UNTILF%:REPEATUNTILNOTINKEY-F%:k%?I%=F%:NEXT:ENDPROC
 1850 DATA Left,Right,Up,Down
 1860 DEFPROCk:FORK%=1TO24:?B%=?A%:A%=A%+1:B%=B%+1:NEXT:B%=B%+&128:FORK%=1TO24:?B%=?A%:A%=A%+1:B%=B%+1:NEXT:ENDPROC
 1870 DEFPROCyay:FORJ%=1TO10:CALLR%:!addr=&6390:!data=D%:CALLS%:NEXT:TIME=0:REPEATUNTILTIME>90:ENDPROC
 1880 DEFPROCchars
 1890 FORI%=0TO479:READW%:I%?&4C00=W%:NEXT:ENDPROC
 1900 DATA 15,15,15,240,30,30,90,240,75,75,195,240,15,15,15,240,30,30,150,240,75,75,75,240,135,15,15,240,15,15,45,240,135,75,75,240,195,135,135,240,240,30,30,240,45,45,45,240,0,17,35,35,71,71,159,175,255,31,45,151,167,45,47,95,0,136
 1910 DATA 204,76,110,46,151,63,158,159,87,71,35,50,17,0,175,45,95,202,39,93,171,255,215,55,46,170,76,68,136,0,0,0,0,16,33,33,82,165,0,96,180,150,148,104,144,80,0,0,0,128,64,72,160,80,164,80,32,32,16,0,0,0,160,148,96,144,148,240,96,0
 1920 DATA 165,160,64,72,128,0,0,0,0,0,0,1,7,37,15,30,0,0,15,150,15,75,30,15,0,0,0,8,14,74,15,75,75,7,0,0,0,0,0,0,75,100,98,100,98,100,98,0,45,14,0,0,0,0,0,0,95,175,95,175,95,175,95,175,95,175,95,175,95,175,95,175,95,175,95,175,95,175,95,175,95,175,95,175,0,0,0,0,0,0
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Micro Messages

A tracer on Super Tracer

AFTER receiving my July copy of Electron User, *I typed in the listing for Super Trace as it seemed to be the answer to a lot of my problems.*

I found, that the top left-hand corner of the screen was inconvenient for the program I am writing, so I redirected output to a user-defined coordinate using the same technique as used in the utility.

There is a lot in the routine that I don't understand. Is it possible to have a blow by blow breakdown of how it works?

In particular, why does it disable and enable interrupts? Is the labelling correct when referring to left and right brackets? Why does it AND the osbyte and osrdch addresses with &FFFF. Are &50 through &54 arbitrary choices?

Where is address &8023 and how does JSR oswrch work with the JMP to that address?

I would be grateful for an explanation as I am keen to improve my assembly language techniques.

I have been trying to read data from a Commodore 64 tape – unsuccessfully. Is it possible to use the Electron to read different tape formats? I think this would make an interesting article or project.

Most of the home computers here seem to be C64s. I want to be able to write a program that will output data that can be read by both computers. Is this possible? – **Mick Green, The Netherlands.**

● The Super Trace code is short but quite complex, and there isn't the space here for a full explanation. We can give a brief summary though: The routine intercepts the print vector oswrch stored at &20E and &20F.

The old value replaces the &8023 in the machine code at line 500 and becomes the new oswrch. So the address &8023 isn't used – it's actually the language entry point for Basic.

The address of the new Super Trace routine is stored in the print vector at &20E/&20F and interrupts are disabled while swapping them over. The micro could crash if it tried to print a character half way through changing the contents of the vector.

The left and right-hand bracket labels are correct. When a left hand bracket is encountered the print position is moved to the top left-hand corner of the screen. When a right-hand bracket is encountered it is printed and the print position restored to its original position.

The routine needs five bytes of workspace. These were taken from zero page for speed and &50 to &54 were chosen because they are unlikely to be used by the program being traced. The section of zero page from &50 to &9F is never used on the Electron.

The osbyte and osrdch vectors are read using the indirection operator ! which reads four bytes. The top 16 bits are masked off with AND &FFFF.

We haven't tried reading different tape formats, or tried altering the built-in one.

Can any readers help?

No Revs for Electron

IN a recent leaflet published by Superior Software Revs was said to be available for the Electron at £12.95. Is this true?

Could I suggest you publish the top 10 selling games for the Electron? Keep up the great work. **D.K. O'Connel, Battersea, London.**

● Revs is not available for the Electron and is unlikely to be converted. You'll find a top 10 chart on Page 6.

The golden rules

I SEEM to remember reading an article in Electron User *about submitting programs for possible publication. It mentioned the conventions readers should adopt, such as using lower case letters for procedures, and the line numbering system to be adopted.*

I have tried unsuccessfully to find this article. Could you please tell me which issue it was in as I have nearly finished a utility which I think would be of interest to other readers. – **Graham Watt, Rockland St. Mary, Norwich**

● The article was called the 18 Commandments and appeared in the March 1985 issue of *Electron User*. Briefly, these commandments are designed to make listings as easy to read and understand as possible and are really just common sense.

For instance, try not to use the letters l or I for variable names – they are too easily confused with the number 1. Similarly O looks like 0.

Also try to avoid multi-statement lines if possible. Single statement ones are easier to read.

Send the program on tape or disc with an accompanying letter (which can also be on tape or disc if you've used a word processor like Mini Office or View) describing how it works – we don't need a listing.

We welcome submissions from readers and are always on the lookout for well written, interesting and unusual programs and articles.

Finally, please include written confirmation that it is all your own work, and it hasn't been published or offered elsewhere.

Compact graphics

MANY thanks for printing two articles of great use to me as an adventure game writer.

I have been experimenting with Adventure Creator and find that although the program is an excellent utility for planning adventures, the memory limitations imposed by the program are driving me back to Basic for the finished game.

Earlier this year I was experimenting with random access filing as a means of retrieving data used in adventure games, but had not thought of the method outlined by Mark Smiddy in his excellent article on compacting graphics in the July issue of Electron User.

*I would like to point out an error in Program VI however. When using this with data descriptions *SPOOLed from View, line 70 was producing an "Out of range" error set up in line 80 with locations with a higher number than nine.*

Upon investigation, I discovered that as the file pointer was not being sent back to the beginning of the file, the value of total% *was not*

Turn to Page 48 ▶

◀ From Page 47

remaining constant.

The solution is fairly straightforward: Move line 70 out of the REPEAT/UNTIL loop starting at line 50. The changes are:

```
45 total%=BGET#X
DELETE 70
```

I hope this will be of help to readers who have been experiencing the same problem.

Please pass on my thanks to Bill Trevelyan for his series on writing adventures – he has already saved me hours of work. – **Michael Cowgill, Retford, Notts.**

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

Out of production

I AM having difficulty finding a Plus 3. Can you give me a guide to stockists in my area? – **Andre Thomson (age 10), Upminster, Essex.**

● The Plus 3 is not in production and unfortunately is no longer available. ACP's Plus 4 and Slogger's SEDFS plus Cumana disc interface are good alternatives. You'll find a review of SEDFS in the June 1987 issue of *Electron User* and the Plus 4 in the June 1986 issue.

Shy software critics

I GET your magazine every month and read it from cover to cover. Most of the games you review in Software Surgery I end up buying.

The programs are excellent, the 10 liners ace and I really look forward to reading the news pages.

But it is Software Surgery I am most interested in. My favourite critic is Beejay because he explains everything in so much detail.

Who is Beejay and is it just his computer name? Many people in our school have computer names because if they write a program they are too shy to put their real names. My computer name is Frank's Bicycle. – **Graeme Rawlings, Gosport, Hants.**

● Beejay is shy too and we couldn't persuade him to reveal his true identity.

Mode 7 graphics

COULD you tell me how I could upgrade my Electron to give a Mode 7 Teletext graphics facility that would initialise at switch on and operate as the BBC Micro does? – **M.Davies, Merthyr Tydfil, Mid Glam.**

● You'll find a review of a Mode 7 adapter in the July 1987 issue of *Electron User*. This piece of hardware plugs directly into the back of the Electron and gives Mode 7 Teletext graphics like the BBC Micro.

Lost in the maze

GREAT magazine. One problem: 10 Liners. Oh, no, I'm not criticising the programs – some of them are good, it's the format.

We all know you can fit 256-odd letters on one Basic line, but do you have to prove it?

It's easy to lose yourself in the maze of colons, so why don't you just change the name to Short Programs, or Just Over 10 Liners and have done with it.

I like to program music into the computer to get it to play them automatically, but as you know, the Electron hasn't got the best of sound systems.

I want some sort of add-on that will upgrade the Electron to BBC standard. Do you know of anyone producing such an upgrade? – **Mark Sidey, Crowborough, East Sussex.**

● 10 Liners has become one of the most popular sections of *Electron User*. Programmers do tend to cram as much into the 10 lines as possible and we have published some excellent programs. We agree, however, that they are not always the easiest of listings to read.

We do try to present a balanced content so you'll find many other short (and long) program listings to type in. These are often easier to key in.

You can't upgrade the sound system of the Electron. Sorry.

Amazing results

I MUST congratulate you on the interesting June 1987 issue of Electron User.

It was fascinating reading about the Flash utility which allows a variety of different flashing colours, and before typing it in I never realised how versatile it could be.

As for the 10 Liners, after typing in Spiral Twister by Gareth Howells I was totally amazed by the results.

I would like to congratulate Bug-byte on its game Dujunz, although after buying it, I found the review was a little over rated and would not have given it Golden Game status.

Apart from that minor disappointment, keep up the good work.

I recently bought three Electron User *tapes and found the standard has improved considerably.*

Fruit Worm (January 1986) was a very addictive game and my niece found Karate Warrior (November 1985) very exciting. One of the programs on the tape providing eight colours in Mode 6, I found very interesting.

After referring to the Advanced User Guide I found out a little about locations &FE08 to &FE0F, referred to as the colour palette, but couldn't understand how to set the bits in these locations for a four colour mode palette.

What I am trying to do is create a Mode 5 screen where the top few lines change logical colours one to three to any colour of my choice while still retaining the original colours on the rest of the screen.

I have tried using VDU 19 in machine code, changing the colours, pausing and changing back, but have found this slows the Electron down too much and goes crazy when I scroll the screen or run a program.

Can you show me how to do this in the fastest possible way?

Finally, is it possible to achieve a Spectrum style loader – flashing the border? – **T.Harris, Paston, Peterborough.**

● The technique used is to set up a machine code event routine synchronised with frame flyback using *FX14,4. When the routine is entered palette one is selected and after a short delay, palette two is selected. You can't use VDU 19, you must poke the values directly into the ULA.

Each of the four logical colours in the palette are made by mixing the primary colours red, green and blue. Three bits are used for each

&FE08

128	64	32	16	8	4	2	1
G3	B2	B1	B0	G3	G2		

&FE09

128	64	32	16	8	4	2	1
		G1	G0	R3	R2	R1	R0

Table I: The four colour palette

logical colour to indicate which primary colours to mix and these are stored in &FE08 and &FE09

Table I shows how these bits are stored – they aren't in any logical order. The letter is the primary colour – R for red, G for green and B for blue and the digit is the logical colour number.

A zero in a particular bit position means a colour is used in the mix. A one means it is not used. To redefine the palette, first calculate the correct bit patterns then store them in &FE08/9

The following program shows how to switch palettes part way down a Mode 5 screen to give eight colours:

```
10 REM Extra Colours
20 mcode=&B00
30 PROCassemble
40 MODE 5
50 FOR i=0 TO 23
60 COLOUR i MOD 4
70 PRINT"* MODE 5 *"
80 NEXT
90 END
100
110 DEF PROCassemble
120 *FX16
130 *FX13,4
140 ?&70=16+32+64
150 ?&71=17+32
160 ?&72=16+32+4+8
170 ?&73=17+2+4
180 FOR i=0 TO 1 STEP 2
190 P%=mcode
200 [OPT i
210 PHP:PHA
220 TXA:PHA
230 TYA:PHA
240 \Palette 1
250 LDA &70:STA &FE08
260 LDA &71:STA &FE09
270 \Delay
280 LDY #8
290 LDX #160
300 .loop
310 DEX:BNE loop
320 DEY:BNE loop
330 \Palette 2
340 LDA &72:STA &FE08
350 LDA &73:STA &FE09
360 PLA:TAY
370 PLA:TAX
380 PLA:PLP
390 RTS
400 ]
410 NEXT
420 ?&220=mcode MOD256
430 ?&221=mcode DIV256
440 *FX14,4
450 ENDPROC
```

Alter the delay loop in lines 270 to 320 to move the position of the palette switch. A copy of the two palettes are stored in &70/&71 and &72/&73. You can set these locations from Basic using the indirection operator ? as in lines 140 to 170.

Unfortunately, it isn't possible to have a Spectrum style loader.

Driving lesson

JULIE Boswell's Printer Driver II in the August 1987 issue of Electron User *is excellent and I can now print my company reports with bright, bold headlines, and italic and underlined sections. The super and subscript modes enable me to print mathematical equations perfectly now.*

I would like to point out one minor hiccup in the otherwise excellent instructions. After creating the printer driver don't type LOAD to load it into View – the correct command to enter is:

```
PRINTER DRIVER
```

Please pass on my thanks for an excellent utility. – **James Baker, Crewe, Cheshire.**

Compatibility problems

COULD you tell me if View 3.0 for the BBC Micro is compatible with the Electron.

Also will the Acorn ADFS rom in the BBC Master work in ACP's Plus 4 thus providing a 1770 DFS and ADFS? **Daniel Johnson, Barnsley, South Yorkshire.**

● Many of the editing functions are accessed using the red function keys on the BBC Micro. The Electron hasn't got them so you won't be able to use the functions.

The ADFS rom in the Master is unlikely to work. But the Electron version in the Plus 3 does. In fact we use a Plus 4 with DFS and ADFS in the office.

Serial connection

ABOUT two years ago I bought an Acorn Electron because it was cheap and used BBC Basic which is also used in my school on BBC model Bs and Masters. It has worked well and I have now decided to add a printer.

I know you can use a Centronics parallel printer with a Plus 1, but I have seen a cheaper serial printer. Can I connect this to my Electron for the same cost as connecting a parallel printer, and at the same time not empty my bank balance? – **John Ross, Edinburgh.**

● You'll need a serial port to plug a serial printer in and for this you'll need a Plus 1 so you might as well stick with a Centronics parallel printer. The cost will be the same in the end.

The Midi connection

I HAVE an Acorn Electron and would like to know if it is possible to connect it to a synthesiser via a Midi. If this is possible, could you let me know the relevent software and hardware needed and where I can buy it. – **Christopher Gee, Middleton, Manchester.**

● Unfortunately, the Electron hasn't got a Midi port and there isn't one available as an add-on.

Arcade tips wanted

I THINK it is very unfair that you have two and a half pages of tips for adventurers yet none for arcade games when they are more popular and always dominate the software charts.

You could have hints, tips, cheats, high scores and maps sent in by readers as in Pendragon's column.

I think you should also have a Game of The Year award where readers could send in their votes for different categories such as best arcade game, best adventure and best sports game. – **Tim Walter, Bristol.**

● We have had many requests for help with arcade games so you'll find a new regular feature called Arcade Corner starting in this issue. If any readers have hints, tips and pokes for any arcade games, why not share them with the rest of us?

Send them in to Arcade Corner here at *Electron User.*

We'll bear in mind your suggestion for a Game Of The Year Award.

Down in the dumps

AFTER saving for a year I finally hit my goal. Yes, I bought the excellent Amstrad DMP 2000 printer.

While looking through old copies of Electron User *I saw in the back issues page that in March 1985 there was a very good screen dump for this printer.*

I saved up to buy bundle two – the six back issues from January to June 1985. When I bought the July 1987 issue of Electron User *I found to my horror that you had no more bundles for sale.*

Could you please publish the screen dumps for the DMP 2000 again? – **Sergio Schirimi, Luton, Bedfordshire.**

● The original bundles were very popular and have now sold out. However, there are several screen dumps in a new bundle. You'll find an order form on page 53.

No escape sequence

I HAVE just typed in the Driver II listing from your August 1987 issue of Electron User. *Could you explain how a highlight function which is controlled by a CHR$ code and not an Escape sequence can be included in the highlight input section of Driver II.*

Compressed print on my Citizen printer is controlled by CHR$(15) and does not use an Escape code.

Many thanks to Julie Boswell for an excellent printer driver and to Database for an informative magazine. – **K.Robinson, Failsworth, Manchester.**

● Driver II will accept both Escape and normal sequences. Simply enter 15 at the input prompt.

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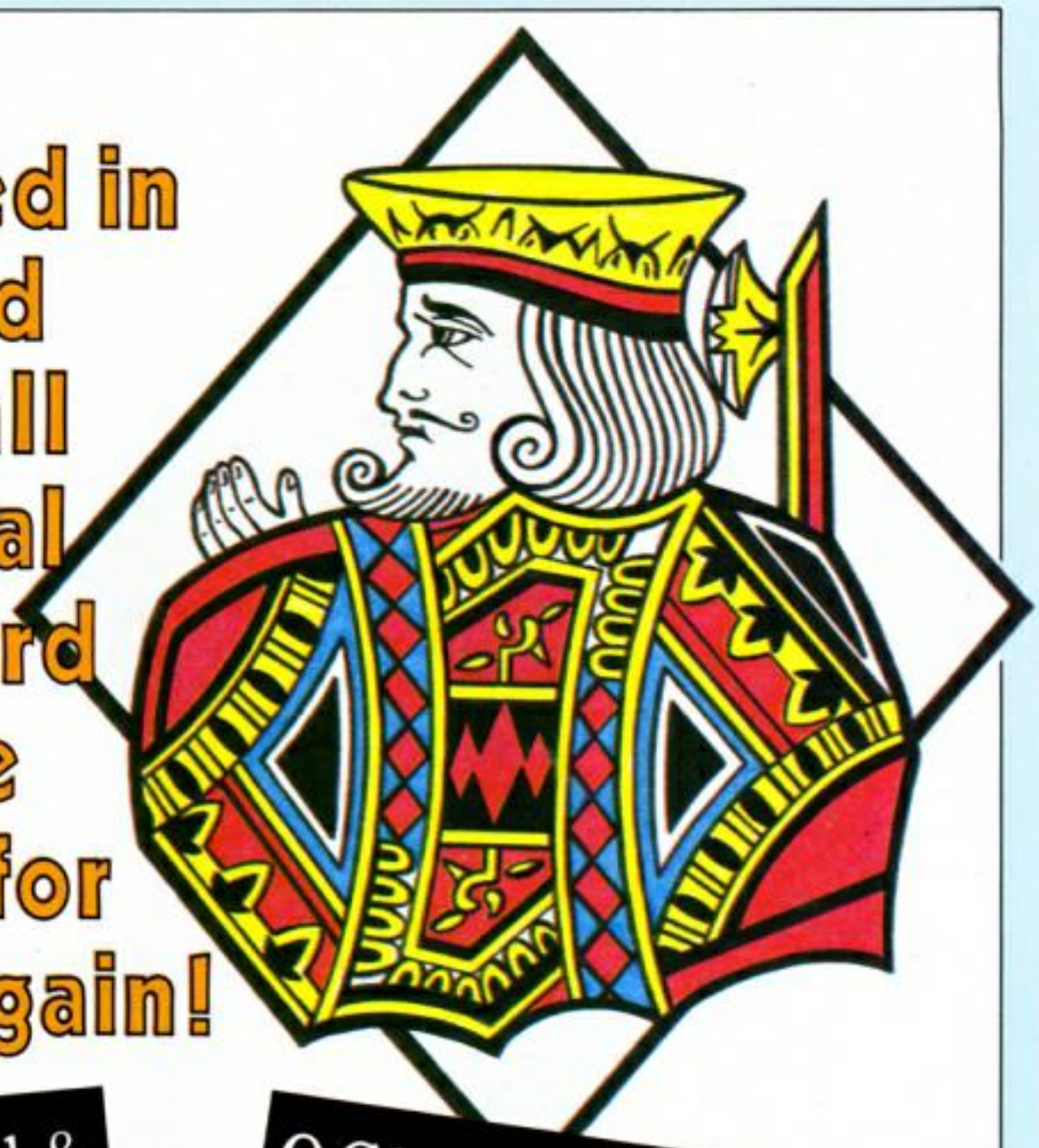

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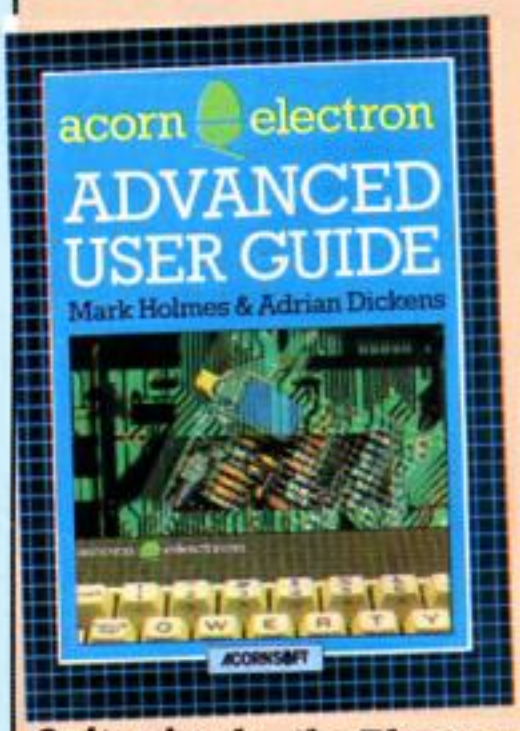

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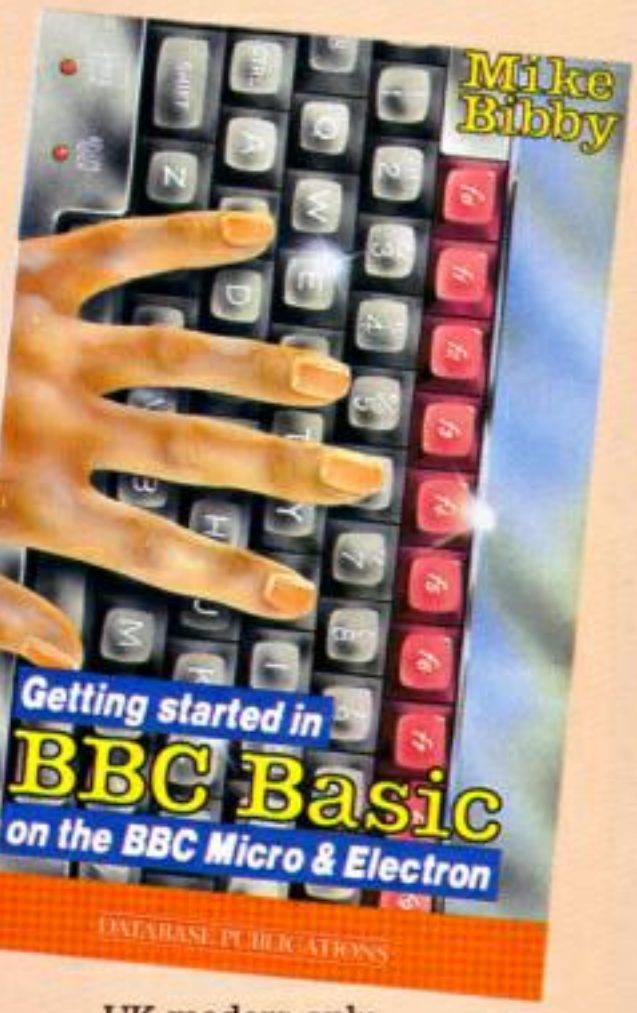

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Enter the exciting world of big business and finance with MARK SMIDDY's Lemonade Stall

LEMONADE Stall is an educational program dealing with the complex topics of business, finance and making (or if you're unlucky, losing) money.

Although it appears to be just a game, Lemonade Stall is a realistic simulation and demonstrates the effect of decisions in various lifelike situations, though many of these have been exaggerated for the sake of playability.

Factors such as greed, weather, popularity of a town, price and desirability of the goods, strikes, human nature, race meetings, carnivals and so on are all taken into account.

As in life, the game cannot be won – the object is to achieve the highest rating (Unbelievable) and accrue the largest amount of money possible.

You assume the role of Jim the Lemonade Seller with the task of making as much money as possible during your six-week summer holidays in the country of Los Palmos.

Los Palmos has four major holiday resorts, Costa Fortune, Costa Lott, Costa Pakett and Costa Mucho.

When the game starts, the main menu shown in Figure I will appear. Initially, you are in Costa Mucho, but can travel between the resorts at any time provided that you have enough money.

To begin, you need to buy stock from the warehouse shown in Figure II. Choose your stock carefully. Ice cream, for instance, is expensive and sells well, but it melts easily in hot weather. It might be prudent to look at the weather report on the main menu before going to the warehouse.

Some of the headings have been abbreviated to save space. These are: Prc – the unit price per item, Rsp – recommended selling price, Pck – the number of units per pack.

To buy stock press a letter and you'll be told how much is available. Enter the amount you wish to buy – which depends on how much money you've got – and it will be added to your stock list.

The warehouse manager will be furious if you ask for too much and can't pay, so you'll have to do a bit of mental arithmetic to work out how much you can afford.

When you have stocked up, checked the weather, set your prices and selected your town you can sell for a day by choosing option G from the main menu.

The day's sales are completed automatically by the program. Any updates, freak storms for example, appear at the bottom of the screen.

During the day, certain situations may crop up, like flat tyres, that cost more money than you have available. In this case, you will have to pay for the repair from your own pocket and your capital may go negative for a short time.

In this case, you may borrow from the bank. Each loan tops up your capital to £10 and will have to be repaid at 15 per cent interest at the end of the game.

After the six weeks the final totals are shown and the program gives its opinion as to your performance.

Your earnings are calculated as 10 per cent of the total profit made. Profit is calculated after debts have been paid and the remaining stock has been written off as a loss at its retail value. So make sure you've sold everything by day 42.

Lemonade Stall is a game where you must speculate to accumulate.

But remember, spend your money wisely and don't keep all of your ice cream in one box.

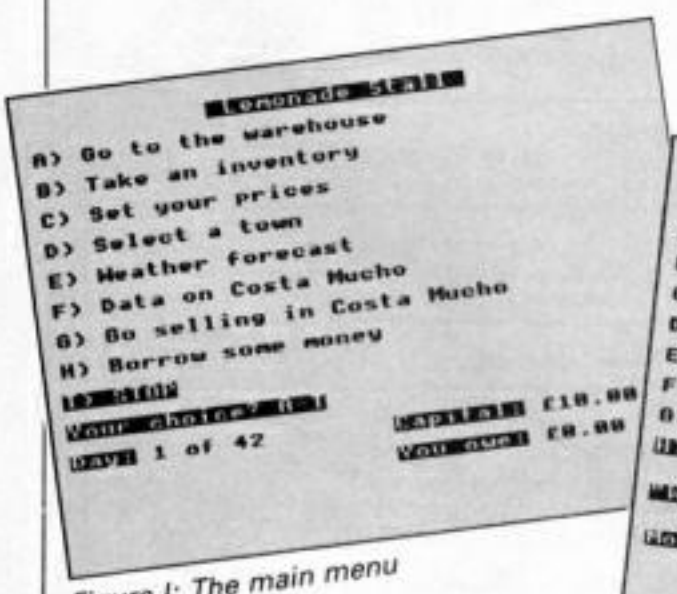


Figure I: The main menu

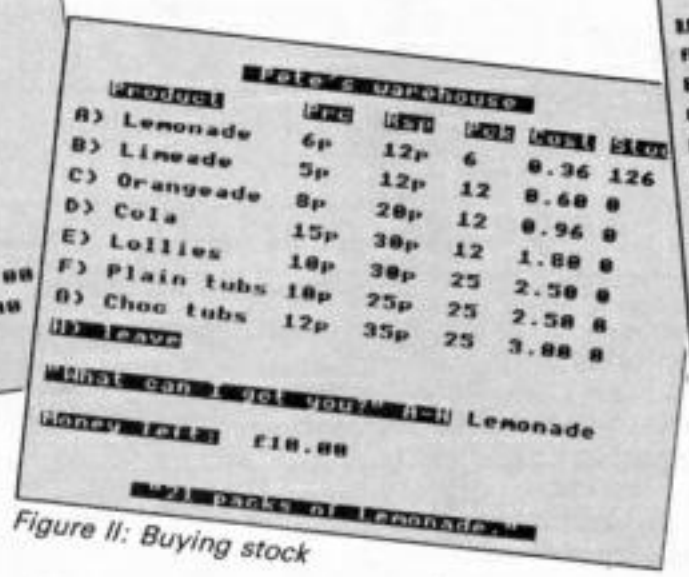


Figure II: Buying stock

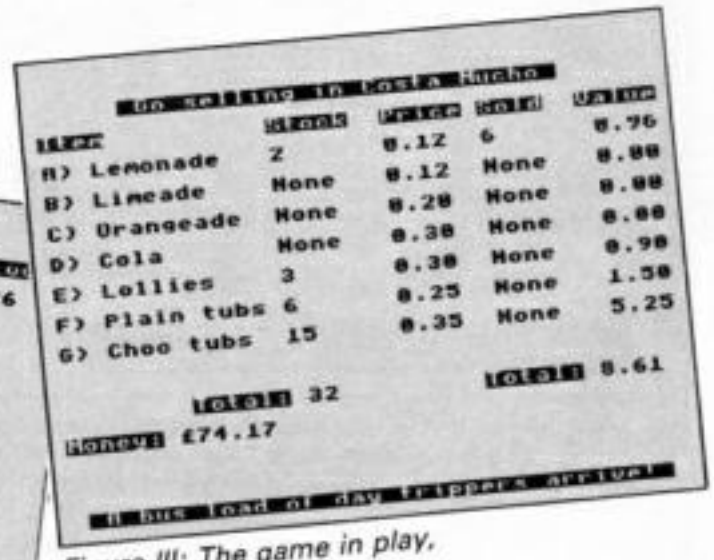
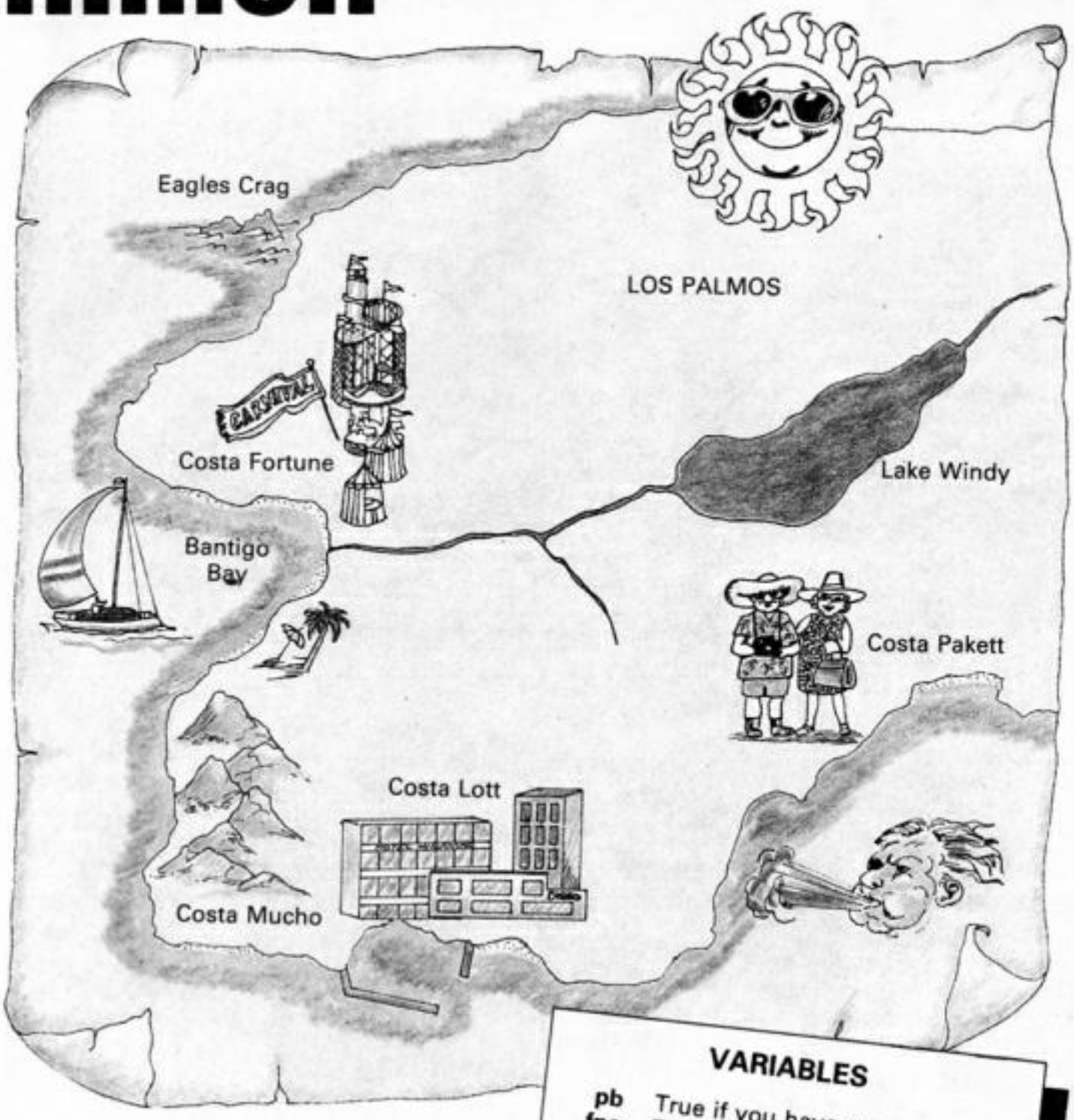


Figure III: The game in play, selling in Costa Mucho

million



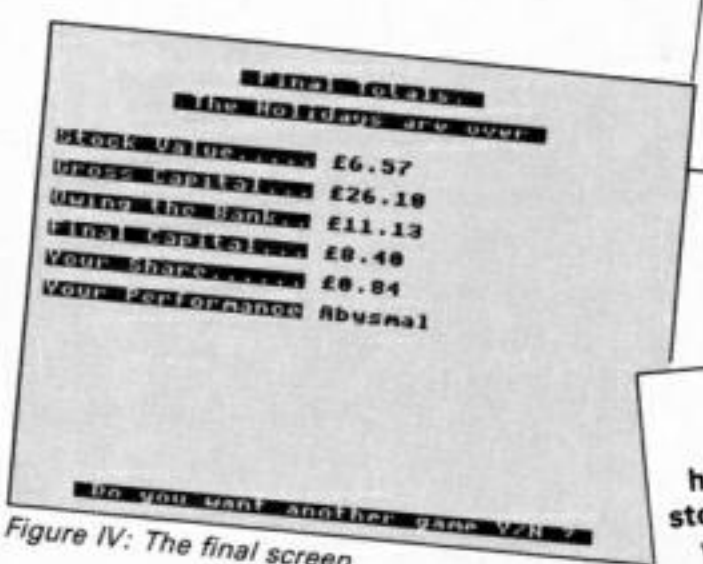


Figure IV: The final screen

VARIABLES

pb	True if you have won a prize
fne	True if you have been fined
out	True if you have outdated stock
srk	True if a factory is on strike
loan	Amount of money borrowed
strm	Number of days since last storm
tstk	Total stocks
m$	Message string

PROCEDURES

head	Print a heading
stocks	Print out the stock list
wait	Wait for a few seconds or a keypress
inv	Print text in inverse video
cent	Centralize some text
calc	Buy an item from the warehouse
msg	Print a message
bad	Make a grating noise

```
   10 REM Lemonade Stall
   20 REM by Mark Smiddy
   30 REM (c) Electron User
   40 MODE 4
   50 VDU23,1,0;0;0;0;
   60 VDU19,0,4;0;28,1,30,38
,1:DRAW0,1023:DRAW1278,1023:
DRAW1278,0:DRAW0,0
   70 PROCinit
   80 REPEAT
   90 PROCinitgame
  100 REPEAT
  110 PROCmainmenu
  120 IF d=42 PROCendgame
  130 UNTIL d=42
  140 UNTIL finished
  150 CLS
  160 PRINT''"Bye."
  170 END
  180 :
  190 DEFPROCmainmenu
  200 VDU12,7:PROChead("Lemo
nade Stall",1)
  210 PRINTTAB(0,3)"A) Go to
 the warehouse"TAB(0,5)"B) T
ake an inventory"TAB(0,7)"C)
 Set your prices"TAB(0,9)"D)
 Select a town"
  220 PRINTTAB(0,11)"E) Weat
her forecast"TAB(0,13)"F) Da
ta on "town$(twn)TAB(0,15)"G
) Go selling in ";town$(twn)
  230 PRINTTAB(0,17)"H) Borr
ow some money"
  240 PROCinv("I) STOP",0,19
)
  250 PROCstats
  260 C%=FNchoice("Your choi
ce?",9,0,21)
  270 :
  280 ON C% GOSUB  2280,3030
,2800,1790,2090,1680,880,790
,310
  290 ENDPROC
  300 :
  310 REM stop game
  320 REPEAT
  330 VDU7
  340 PROCmsg("Really QUIT Y
/N?")
  350 dum=dum AND &DF
  360 UNTILdum=78 OR dum=89
  370 IF dum=89 d=42
  380 RETURN
  390 :
  400 DEFPROCendgame
  410 ?&70=&60
  420 L%=?&20E
  430 H%=?&20F
  440 ?&20E=&70
  450 ?&20F=0
  460 PROCstocks
  470 ?&20E=L%
  480 ?&20F=H%
  490 CLS:PROChead("Final To
tals.",1)
  500 PROChead("The Holidays
 are over",3)
  510 @%=&20205
  520 value=value/100
  530 fc=money-value-loan
  540 PROCinv("Stock Value..
...",0,6):PRINT"£";value
  550 PROCinv("Gross Capital
...",0,8):PRINT"£";money
```

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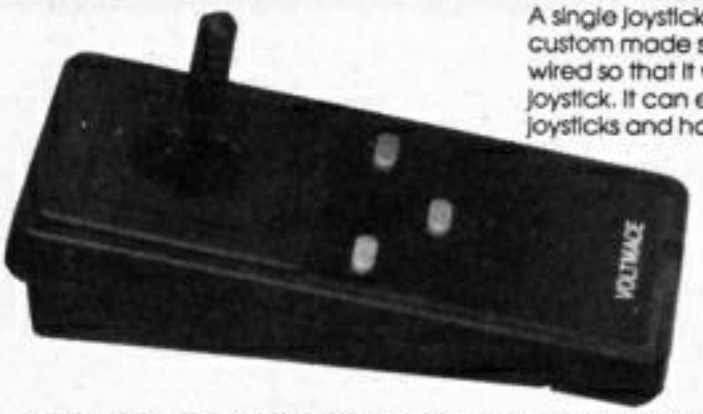
JOYSTICKS—THE COMPLETE SOLUTION



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TO ORDER TURN TO THE FORM ON PAGE 53

Lemonade listing

◀ From Page 55

```
  560 PROCinv("Owing the Ban
k..",0,10):PRINT"£";loan
  570 PROCinv("Final Capital
...",0,12):PRINT"£";fc
  580 PROCinv("Your Share...
...",0,14):PRINT"£";fc*0.1
  590 PROCinv("Your Performa
nce",0,16)
  600 RESTORE4600
  610 IF fc<0 fc=0
  620 FOR N%=0 TO 10
  630 READ s%,m$
  640 IFs%<fc msg$=m$
  650 NEXT
  660 PRINTmsg$
  670 VDU23,1,0;0;0;0;
  680 REPEAT
  690 PROCmsg("Do you want a
nother game Y/N ?")
  700 dum=dum AND &DF
  710 UNTIL dum=78 OR dum=89
  720 IF dum=78 finished=TRU
E
  730 ENDPROC
  740 :
  750 DEFPROCstats
  760 PROCinv("Day:",0,23):P
RINT;d;" of 42":PROCinv("Cap
ital:",20,23):@%=&20205:PRIN
T;"£";money;"  ":PROCinv("Yo
u owe:",20,25):PRINT;"£";loa
n;"  ";:@%=0
  770 ENDPROC
  780 :
  790 IF money>=10 PROCmsg("
You're not broke yet!"):RETU
RN
  800 REPEAT
  810 PROCmsg("Really borrow
 some money?")
  820 UNTILdum<>-1
  830 IF (dum AND &DF)=89 AN
D loan<200:brw=10-money:i=br
w*0.15:loan=loan+brw+i:money
=10:PROCmsg("Loan agreed, fi
xed interest of 15%")
  840 IF (dum AND &DF)=89 AN
D loan>=200 PROCmsg(""You o
we too much already""):PROC
msg(""Get out of my bank!"
")
  850 PROCstats
  860 RETURN
  870 :
  880 REM next days trade
  890 CLS:PROChead("Go selli
ng in "+town$(twn),2)
  900 d=d+1
  910 IF oops oops=oops-1
  920 IF srk srk=srk-1
  930 IF strm strm=strm-1
  940 IF out out=out-1
  950 PROCclrsold
  960 PROCstocks
  970 PROCinv("Sold",27,4)
  980 PROCinv("Money:",0,24)
  990 @%=&20205
 1000 PRINT"£";money'
 1010 @%=0
 1020 PROCothers
 1030 IF srk=1 PROCmsg("The
strike is over!"):srk=-1
 1040 bias=bias(twn)+FNdaily
(RND(5))
 1050 FORp%=0 TO 6
 1060 sl=((rsp(p%)-apc(p%))+
ABS(p%-RND(3))+(bias/2)+(wea
ther*2))+0.8
 1070 IF sl<0 sl=0
 1080 FORi%=0TO10
 1090 PROCevent
 1100 NEXT
 1110 PROCsellstock(p%)
 1120 NEXT
 1130 FORN%=1TO4
 1140 f(N%)=RND(8)
 1150 NEXT
 1160 PROCforc(twn)
 1170 PROCmsg("End of the da
y")
 1180 PROCreport
 1190 RETURN
 1200 :
 1210 DEFPROCreport
 1220 CLS
 1230 PROChead("Report on th
e day's sales",2)
 1240 r%=1:PROCstocks:r%=0
 1250 PROCinv("Sold",27,4)
 1260 PROCinv("Profit",0,26)
 1270 @%=&20205
```

This is one of hundreds of programs available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

```
 1280 PRINT;"£";profit/100
 1290 @%=0
 1300 PROCshowsold
 1310 PROChead("Press a key"
,29)
 1320 PROCwait(3000)
 1330 ENDPROC
 1340 :
 1350 DEFPROCstkloss(t)
 1360 IFstk(t)=0ENDPROC
 1370 IF t<4 PROCmsg("Some o
f your "+prod$(t)+" is damag
ed")
 1380 IF t>3 PROCmsg("Some o
f your "+prod$(t)+" melt")
 1390 PROCbad
 1400 stk(t)=INT(stk(t)*RND(
1))
 1410 ENDPROC
 1420 :
 1430 DEFPROCbad
 1440 FORn%=0 TO2:SOUND 0,-1
5,3,3:SOUND 0,0,3,3:NEXT:SOU
ND 0,-15,4,5
 1450 ENDPROC
 1460 :
 1470 DEFPROCblk(Y%)
 1480 PRINTTAB(0,Y%)STRING$(
40," ")
 1490 ENDPROC
 1500 :
 1510 DEFPROCsellstock(item)
 1520 PROChowmany
 1530 IF t%>stk(item)/3 t%=s
tk(item)/3
 1540 stk(item)=stk(item)-t%
 1550 money=money+(apc(item)
/100)*t%
 1560 sold(item)=sold(item)+
t%
 1570 tstk=tstk-t%
 1580 IFtstk<=0 p%=7
 1590 PROCshowsold
 1600 PROCshowstock
 1610 ENDPROC
 1620 DEFPROChowmany
 1630 t%=sl*10
 1640 t%=t%/100*stk(p%)
 1650 IF t%>100 t%=RND(t%-10
0)
 1660 ENDPROC
 1670 :
 1680 REM data on town
 1690 RESTORE4480
 1700 FORN%=1TOtwn
 1710 READ m$
 1720 NEXT
 1730 CLS:PROChead("Informat
ion on "+town$(twn),2)
 1740 PRINT""town$(twn)+" "
+m$+"."
 1750 PROChead("Press a key"
,29)
 1760 PROCwait(2000)
 1770 RETURN
 1780 :
 1790 REM show towns
 1800 CLS:PROChead("Select a
nother town",2)
 1810 FORN%=1TO4
 1820 IFN%=twn PROCinv(CHR$(
64+N%)+") "+town$(twn),0,4+N
%*2) ELSE PRINTTAB(0,4+N%*2)
;CHR$(64+N%);") "town$(N%)
 1830 NEXT
 1840 C%=FNchoice("Which tow
n?",4,0,14)
 1850 IFC%=twn PROCmsg("Alre
ady there!"):ENDPROC
 1860 IF C%=1 OR C%=2 PROCms
g("It costs £"+STR$(C%*5)+"
to trade there!")
 1870 IF (C%=1 OR C%=2) AND
(C%*5)>money PROCmsg("You ca
n't afford it!"):ENDPROC:ELS
E IF C%=1 OR C%=2 money=mone
y-C%*5:twn=C%
 1880 IF (C%=3 OR C%=4) twn=
C%
 1890 IF RND(9)=8 M%=RND(10)
+10:PROCmsg("You get a flat
tyre on the way"):PROCmsg("T
he cost of repair is £"+STR$
(M%)):money=money-M%:PROCbad
 1900 RETURN
 1910 :
 1920 DEFPROCclrsold
 1930 FOR N%=0TOnum
 1940 sold(N%)=0
 1950 NEXT
 1960 ENDPROC
 1970 :
 1980 DEFPROCshowsold
 1990 FOR N%=0TOnum-1
 2000 PRINTTAB(27,6+N%*2);:I
F sold(N%)<>0PRINT;sold(N%);
"   " ELSE PRINT ;"None"
 2010 NEXT
 2020 ENDPROC
 2030 DEFPROCshowstock
 2040 FORN%=0TOnum-1
 2050 PRINTTAB(14,6+N%*2);:I
Fstk(N%)<>0 PRINT;stk(N%);"
  " ELSE PRINT"None"
 2060 NEXT
 2070 ENDPROC
 2080 :
 2090 REM weather forecast
 2100 CLS:t%=twn
 2110 PROChead("Weather repo
rt",1)
 2120 PRINTTAB(0,4)"The weat
herman says it will be:"
 2130 FOR I%=1 TO 4
 2140 PROCforc(I%)
 2150 PRINT"m$;" in "town$(
I%)"."
 2160 NEXT
 2170 PROChead("Press a key"
,29)
 2180 PROCwait(2000)
 2190 RETURN
 2200 :
 2210 DEFPROCforc(F)
 2220 RESTORE4570
 2230 FORN%=1TOf(F)
 2240 READm$,weather
 2250 NEXT
 2260 ENDPROC
 2270 :
 2280 REM buystock
 2290 CLS:PROChead(wm$(twn)+
"s warehouse",1)
 2300 PROCinv("Product",2,3)
 2310 PROCinv("Prc",14,3)
 2320 PROCinv("Rsp",19,3)
 2330 PROCinv("Pck",24,3)
 2340 PROCinv("Cost",28,3)
 2350 PROCinv("Stock",33,3)
 2360 PROClist(5)
 2370 REPEAT
 2380 @%=&20205
 2390 PROCinv("Money left:",
0,25)
 2400 PRINT" £"money;"  ";
 2410 IFoops=4 VDU7:PROCmsg(
""I told you to get out!""
):C%=0:@%=0:UNTILC%=0:RETURN
 2420 @%=0
 2430 C%=FNchoice(""What ca
n I get you?"",8,0,22)
 2440 PRINT" "+prod$(C%-1)
 2450 IF srk>0 AND C%<5 PROC
msg(""Sorry, none available
""):UNTIL C%=8
 2460 IF C%<8 PROCcalc(C%-1)
 2470 UNTIL C%=8
 2480 RETURN
 2490 :
 2500 DEFPROCcalc(item)
 2510 cost=(prc(item)/100)*m
in(item)
 2520 upper=INT(money/cost)*
10
 2530 amt=FNinput(""How man
y would you like?"",0,upper
,0,27)
 2540 PRINTTAB(0,27)SPC(37)
 2550 IF amt<=0 ENDPROC
 2560 cost=cost*amt
 2570 IF cost>money VDU7:PRO
Cmsg("Short of cash! "+wm$(t
wn)+" is miffed!"):oops=oops
+1
 2580 IF cost<=money money=m
oney-cost:stk(item)=stk(item
)+(min(item)*amt):PROCstklis
t(5):PROCmsg(""+STR$(amt)+
" packs of "+prod$(item)+"."
")
 2590 IF oops=3 VDU7:PROCmsg
(wm$(twn)+" looks very angry
!")
 2600 IF oops=4 VDU7:PROCmsg
(""Get out of my warehouse!
""):C%=8
 2610 ENDPROC
 2620 :
 2630 DEFPROClist(Y%)
 2640 FORN%=0TOnum-1
 2650 PRINTTAB(0,Y%+N%*2);CH
R$(65+N%);") ";prod$(N%);TAB
(14,Y%+N%*2);prc(N%);"p";TAB
(19,Y%+N%*2);rsp(N%);"p";TAB
(24,Y%+N%*2);min(N%)
```

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Lemonade listing

◀ From Page 57

```
 2660 @%=&20205
 2670 PRINTTAB(28,Y%+N%*2);p
rc(N%)*min(N%)/100
 2680 @%=0
 2690 NEXT
 2700 PROCinv("H) leave",0,N
%*2+Y%)
 2710 PROCstklist(Y%)
 2720 ENDPROC
 2730 :
 2740 DEFPROCstklist(Y%)
 2750 FORN%=0TOnum-1
 2760 PRINTTAB(33,Y%+N%*2)st
k(N%)
 2770 NEXT
 2780 ENDPROC
 2790 :
 2800 REM set the prices
 2810 CLS
 2820 PROChead("Fix your pri
ces for "+town$(twn),2)
 2830 PROCstocks
 2840 PROCinv("H) All done",
0,20)
 2850 REPEAT:REPEAT
 2860 C%=FNchoice("Which ite
m?",8,0,24)
 2870 IFC%=8 UNTILC%=8:UNTIL
1:RETURN
 2880 C%=C%-1
 2890 IFstk(C%)=0 PROCmsg("N
one of that in stock!")
 2900 UNTIL stk(C%)
 2910 PRINT;prod$(C%);STRING
$(10," ")
 2920 PRINT"Price now:";prc
(C%)
 2930 upper=rsp(C%)*2
 2940 lower=INT(rsp(C%)/2)
 2950 list=0
 2960 apc(C%)=FNinput("Price
 of "+prod$(C%),lower,upper,
0,26)
 2970 PRINTTAB(0,26)STRING$(
40," ")
 2980 list=1
 2990 PROCstocks
 3000 UNTIL0
 3010 RETURN
 3020 :
 3030 REM inventory
 3040 CLS:PROChead("Inventor
y",2)
 3050 PROCstocks
 3060 PROChead("All present
and correct.",29)
 3070 PROCwait(10000)
 3080 RETURN
 3090 :
 3100 DEFPROCstocks
 3110 PROCinv("Item",0,4)
 3120 PROCinv("Stock",14,4)
 3130 PROCinv("Price",21,4)
 3140 PROCinv("Value",33,4)
 3150 Y%=6:tstk=0:value=0:pr
ofit=0
 3160 FORN%=0TOnum-1
 3170 PRINTTAB(0,Y%+N%*2);CH
R$(N%+65);") ";prod$(N%)
 3180 @%=&20205
 3190 PRINTTAB(20,Y%+N%*2)ap
c(N%)/100
 3200 @%=&2020A
 3210 PRINTTAB(28,Y%+N%*2);:
IFr% PRINTapc(N%)*sold(N%)/1
00 ELSE PRINTapc(N%)*stk(N%)
/100
 3220 @%=0
 3230 tstk=tstk+stk(N%)
 3240 IF r% value=value+(apc
(N%)*sold(N%)) ELSE value=va
lue+(apc(N%)*stk(N%))
 3250 profit=profit+((apc(N%
)-prc(N%))*sold(N%))
 3260 NEXT
 3270 PROCshowstock
 3280 PROCinv("Total:",8,22)
:PRINTtstk
 3290 IFvalue<10 tmp=2 ELSE
tmp=0
 3300 t$=STR$(value)+"Total:
"
 3310 X%=36-(LEN(t$)+tmp)
 3320 @%=&2020A
 3330 PROCinv("Total:",X%,22
)
 3340 PRINT;value/100
 3350 @%=0
 3360 ENDPROC
 3370 :
 3380 DEFPROChead(m$,Y%)
 3390 COLOUR129:COLOUR0
 3400 m$=" "+m$+" "
 3410 PROCcent(m$,Y%)
 3420 COLOUR128:COLOUR1
 3430 ENDPROC
 3440 :
 3450 DEFPROCinv(m$,X%,Y%)
 3460 COLOUR129:COLOUR0
 3470 PRINTTAB(X%,Y%)m$;
 3480 COLOUR128:COLOUR1
 3490 PRINT" ";
 3500 ENDPROC
 3510 :
 3520 DEFPROCcent(m$,Y%)
 3530 LOCALX%:X%=(38-LENm$)/
2
 3540 PRINTTAB(X%,Y%)m$;
 3550 ENDPROC
 3560 :
 3570 DEFPROCmsg(m$)
 3580 LOCAL X,Y
 3590 X=POS:Y=VPOS
 3600 PROChead(m$,29)
 3610 PRINTTAB(X,Y);
 3620 PROCwait(250)
 3630 PRINTTAB(0,29)STRING$(
37," ");
 3640 PRINTTAB(X,Y);
 3650 ENDPROC
 3660 :
 3670 DEFPROCwait(time)
 3680 *FX 15
 3690 dum=INKEY(time)
 3700 ENDPROC
 3710 :
 3720 DEFFNchoice(m$,max,X,Y
)
 3730 m$=m$+" A-"+CHR$(64+ma
x):PROCinv(m$,X,Y)
 3740 REPEAT:X=LENm$:PRINTTA
B(X,Y)STRING$(15," "):PRINTT
AB(X,Y);
 3750 VDU23,1,1;0;0;0;
 3760 G=GET AND &DF
 3770 VDU23,1,0;0;0;0;
 3780 UNTIL G>=65 AND G<=65+
max
 3790 =G-64
 3800 DEFFNinput(m$,min,max,
X,Y)
 3810 m$=m$+" "+STR$(min)+"-
"+STR$(max)+":":PROCinv(m$,X
,Y)
 3820 REPEAT:X=LENm$:PRINTTA
B(X,Y)STRING$(15," ")
 3830 VDU23,1,1;0;0;0;
 3840 INPUTTAB(X,Y)T
 3850 VDU23,1,0;0;0;0;
 3860 IF (T<min OR T>max) AN
D T<>0 VDU7:PROCerr
 3870 UNTILT>=min ANDT<=max
 3880 PRINTTAB(X-4,Y);
 3890 =T
 3900 :
 3910 DEFPROCevent
 3920 E%=RND(999)
 3930 IFE%>10 AND E%<12 M=5+
RND(5):PROCmsg("You're caugh
t littering!"):PROCmsg("The
fine is £"+STR$(M)):money=mo
ney-M
 3940 IFE%>990PROCmsg("A bus
 load of day trippers arrive
!"):p%=p%/2
 3950 IFE%=13 AND strm=0 PRO
Cmsg("A freak storm hits!"):
PROCbad:PROCmsg("All of your
 stock is lost."):FORN%=0TOn
um-1:stk(N%)=0:NEXT:strm=35
 3960 IF f(twn)<3 AND E%>97
AND E%<110 PROCstkloss(RND(7
)-1)
 3970 IF E%=200 AND fne=0PRO
Cmsg(""Ello, 'ello 'ello."
"):PROCmsg(""Trading witho
ut a licence are we?""):PRO
Cmsg("Fined £30"):PROCmsg("L
icence fee £20"):money=money
-50:fne=1
 3980 DEFPROCothers
 3990 IF E%=199 AND out=0 PR
OCmsg("You have some outdate
d stock"):PROCmsg("It has to
 be thrown away"):FORN%=0TO6
:PROCstkloss(N%):NEXT:out=RN
D(20)
 4000 IF E%=100 PROCmsg("The
re's a strike at the factory
!"):PROCmsg("Drinks are unav
ailable"):srk=RND(20)
 4010 IFE%=50 AND pb=0 PROCm
sg("You win a £50 for.....")
:PROCmsg("Running the tidies
t stand!"):money=money+50:pb
=1
 4020 ENDPROC
 4030 :
 4040 DEFFNdaily(E)
 4050 RESTORE4140
 4060 IF E<3 THEN FOR N%=1TO
E:READm$,b:NEXT:PROCmsg(m$):
=b
 4070 IF E=3 AND f(twn)>1 TH
EN PROCmsg("The weather impr
oves!"):=1
 4080 IFE=3 AND f(twn)<3 THE
N PROCmsg("The weather worse
ns..."):=-1.5
 4090 IFE=4 THEN PROCmsg("To
day is race day in Costa For
tune")
 4100 IFE=4 ANDtwn=2 THEN=1.
8 ELSE IF E=4 THEN =-1.9
 4110 IFE=5 THEN REPEATt=RND
(4):UNTILt<>twn
 4120 IFE=5 THEN PROCmsg("Th
e fair has gone to "+town$(t
)):=-1.8
 4130 =0
 4140 DATA The fair is in to
wn!,1.5
 4150 DATA It's carnival! Le
t's party!,1.2
 4160 :
 4170 DEFPROCerr
 4180 IF list PROCmsg("That
isn't on the list!"):ENDPROC
 4190 PROCmsg("Silly price!"
)
 4200 ENDPROC
 4210 :
 4220 DEFPROCinit
 4230 num=7:r%=0
 4240 DIMprod$(num),prc(num)
,min(num),rsp(num),stk(num),
apc(num),sold(num),town$(4),
t(4),wm$(4),f(4),bias(4)
 4250 ENDPROC
 4260 :
 4270 DEFPROCinitgame
 4280 finished=0:money=10:oo
ps=0:d=1
 4290 list=1:srk=0:fne=0:pb=
0:loan=0
 4300 strm=0:out=0:@%=0:twn=
4
 4310 RESTORE 4450
 4320 FORN%=1TO4
 4330 READ town$(N%),bias(N%
),wm$(N%)
 4340 f(N%)=RND(8)
 4350 NEXT
 4360 PROCforc(twn)
 4370 PROCclrsold
 4380 RESTORE4540
 4390 FOR N%=0TOnum-1
 4400 READ prod$(N%),prc(N%)
,min(N%),rsp(N%)
 4410 stk(N%)=0:apc(N%)=rsp(
N%)
 4420 NEXT
 4430 ENDPROC
 4440 :
 4450 DATA Costa Lott,2,Rola
nd,Costa Fortune,5,Alf
 4460 DATA Costa Pakett,4,De
rek,Costa Mucho,3,Pete
 4470 :
 4480 DATA is a small seasid
e town
 4490 DATA is a holiday reso
rt
 4500 DATA is a sleepy littl
e haven
 4510 DATA is near to Costa
Lott
 4520 :
 4530 REM product,price p,mi
nimum to buy,recomended sell
ing price
 4540 DATA Lemonade,6,6,12,L
imeade,5,12,12,Orangeade,8,1
2,20,Cola,15,12,30,Lollies,1
0,25,30,Plain tubs,10,25,25,
Choc tubs,12,25,35
 4550 :
 4560 REM Weather
 4570 DATA Very hot,5,Hot an
d sunny,3.5,Warm and pleasan
t,2.2,A little cool,1,Overca
st,0,Drizzling,-2,Raining ge
ntly,-3,Raining heavily,-5
 4580 :
 4590 REM verdict
 4600 DATA -1,Abysmal,20,Pat
hetic,30,Very Poor,35,Poor,5
0,Disapointing,70,reasonable
,100,Average,150,Above avera
ge,200,Excellent,500,Quite s
uperb,1000,Unbelievable
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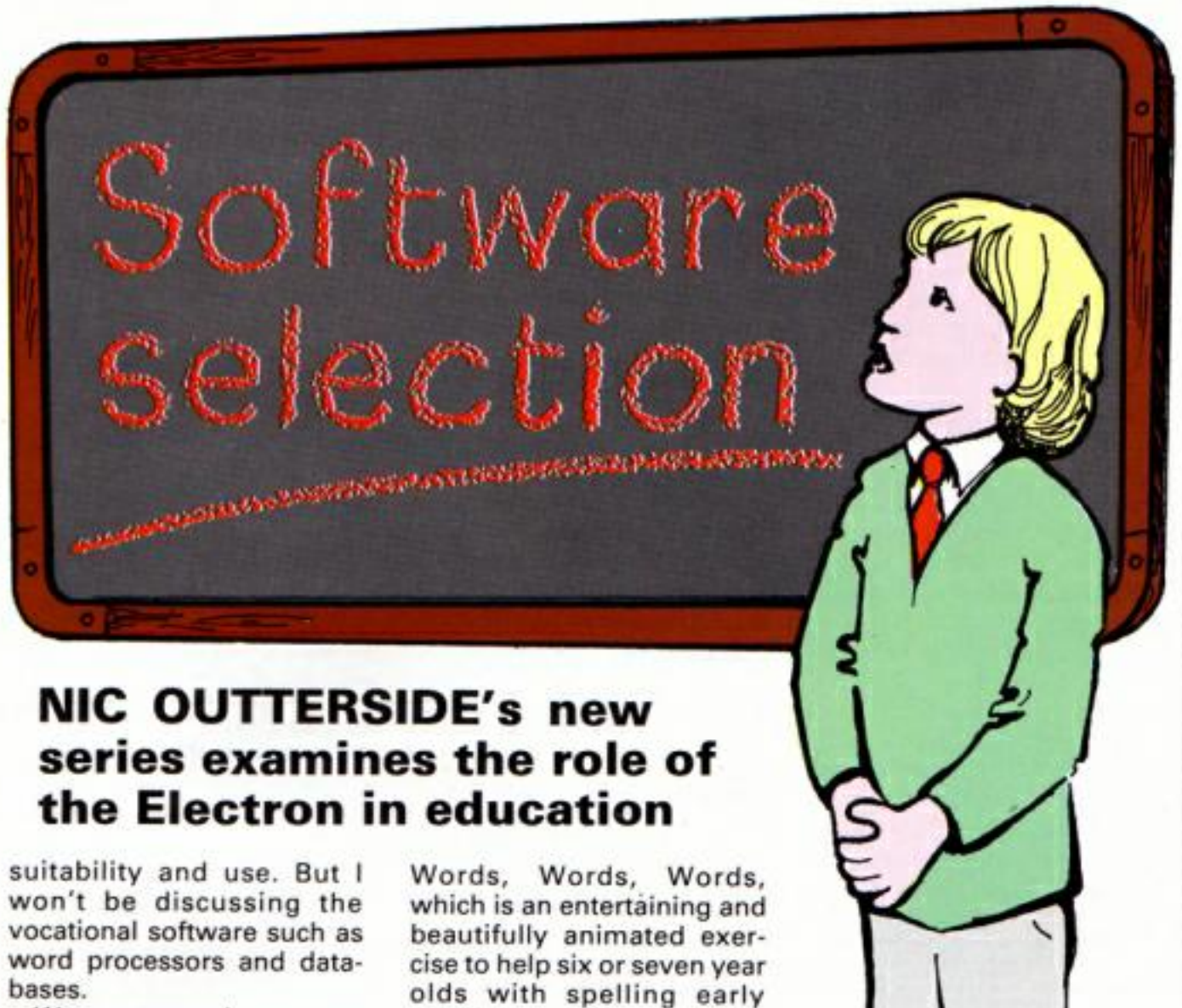

Software selection

NIC OUTTERSIDE's new series examines the role of the Electron in education

"I BOUGHT little Johnny an Acorn Electron last Christmas, because he uses a BBC Micro at school and I was told the Electron could run the same programs as the BBC. But I can't find any suitable software anywhere".

If during my years in teaching, I was given £5 every time I heard that statement, I would be a rich man.

I know dozens of parents who bought an Electron for one reason only – they hoped it would help their child with computing at school.

Yet in nearly every case they were frustrated in their search for educational software for this excellent machine.

We at *Electron User* continue to give widespread support in all aspects of educational uses for the Electron.

The excellent series by Roger Frost, from May to August 1986, and the complete list of educational software in the September 1985 issue, proves that.

It seems however, that the real problem lies in the unavailability of educational programs in the shops.

The reason for this is fairly straightforward. Most of the large chain stores will only buy educational software from publishers on a sale or return basis.

After all, such programs hardly have the immediate sales appeal of say Elite or Repton.

Most publishing companies therefore regard it as economically unwise to venture into this kind of agreement and thus lose a massive distribution network.

So, where do we go from here? Luckily, the whole range of educational software can be bought – often at bargain prices – from a variety of mail order companies, or directly from the suppliers.

In this series I aim to look at the vast area of educational software available and give some idea of its suitability and use. But I won't be discussing the vocational software such as word processors and databases.

We are now in an age where many pre-school infants have access to a home micro and perhaps need guiding towards the immense pleasure of some of the early reading and number programs which have been developed.

ASK's Best Four Language and Best Four Number are two that I recommend to any parent of a young child. At about £18 for each pack of four programs they represent excellent value for money and remarkable addictiveness.

The Best Four Language suite incorporates Hide and Seek a colourful game for training visual memory and sequencing, an important prerequisite to reading.

This is followed by a marvellous little fellow called Podd, who helps develop an early sight vocabulary.

This particular computer creature has had my three-year-old son glued to the monitor for the past 18 months. It has drawn the same response from five and six year olds I have taught.

The third offering is Words, Words, Words, which is an entertaining and beautifully animated exercise to help six or seven year olds with spelling early social-sight words.

The package closes with Facemaker, a clever utility for drawing faces while extending the child's comprehension of written instructions.

Both ASK boxes come complete with extensive documentation and booklets and games for follow-up work.

Golem is a company which has developed an excellent reputation for educational software and offers about half a dozen packages all at about £7 each.

I have used their Fun with Words tape extensively in and out of school. Alphabet and Vowels are excellent aids to learning letter shapes and sounds and later the child can progress to Punctuation, There and Suffix.

All the software I have mentioned can be used without fear of disrupting or confusing school work, as all deal exclusively with developing or practising basic educational skills.

On a broader horizon the offerings from Mirrorsoft are colourful and stimulating though not always structured in their approach to learning.

A typical example of the Mirrorsoft ethos is their game, Crack it Towers. Despite trying to be a "Jack of all games and master of none" it is still an excellent buy at £8.95.

Their various Mr Men titles with a recommended retail price of about £8 can be bought for as little as £2 from selected Mail Order companies.

The Giddy Game Show, is however, a much more professional approach to early learning and is based

Turn to Page 62 ►

Education

◀ From Page 61

directly upon the Yorkshire Television programme of the same name.

The packaging and approach is similar to the ASK programs and the graphics are outstanding.

To help with early numeracy which will probably involve counting, adding and simple subtraction, I suggest that you look no further than Duckworth's Competitive Maths which can also be used with much older children.

At only £5.95 it is even better value than Golem's Fun with Numbers.

I suggest that if you want real value for money you look no further than the pages of this magazine. The early learning programs featured in Classroom Computing with the Electron volumes one and two have been the most widely used educational software in my collection.

House and Windmill by Len Scott are super little graphics programs which help with early reading and keyboard familiarity, though a colour monitor or TV is a prerequisite to playing them.

Snap is a wonderful letter recognition game which has a certain addictive quality about it. While Spelldroid is a good program for ironing out early spelling problems.

Numeracy is covered by Tuadd, Tusub, Chinese Takeaway and Mapping. Table Mountain – a tables game for the more advanced seven year olds – has almost worn out the keys on my Electron. We have recently set up a league table for the fastest tables mountaineer.

Most of these programs together with some other wonders such as Denary Derrick, Counting, Balance and Magic Garden are included in Database Publications' Fun School 2-5 and Fun School 5-8. At only £5.95 each, they are an absolute giveaway for parents searching for educational software.

In addition, LCL, ABC and BBC Software have also produced some excellent early learning software for the Electron. ■

Educational software suppliers

Applied Systems Knowledge (ASK), London House, 68 Upper Richmond Road, London SW15 2RP, Tel: 01-874 6046

Golem Software, 77 Qualitas, Bracknell, Berkshire RG12 4QG, Tel: 0334 50720

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AFRICA

Repton Returns . . . to Conquer the World

After the success of Repton 3, we were overwhelmed with requests for us to publish another set of screens for the game. We have now produced 40 new screens which, although enticingly amusing, are even trickier to complete than the original 24 screens of Repton 3.

These new screens feature Repton voyaging around the world. In America, Repton is a sheriff with a penchant for hamburgers and whisky; his job is to jail all the bandits and avenge the Red Indians. The Arctic sees Repton as an eskimo being "hotly" pursued home to his igloo by polar bears and penguins. Across to the Orient, and Repton is a kung-fu master amongst the pagodas, rickshaws and Chinese dragons. Repton becomes a deep-sea diver in the Oceans; he searches for pearls around the rotting shipwrecks which are inhabited by dangerous octopuses and squids. Finally, in Africa, Repton reaps his rewards by defeating the tribesmen, caging the parrots, and collecting the apples, bananas and pineapples — whilst watching out for falling coconuts!

THE SCREEN EDITOR

Each copy of Around The World in 40 Screens includes:

- the Repton 3 main program,
- the Repton 3 editor, and
- the 40 new game screens.

BBC Micro Cassette £6.95
BBC Micro 5¼" Disc.....£7.95
BBC Master Compact 3½" Disc £9.95
Acorn Electron Cassette..£6.95

(Compatible with the BBC B, B+ and Master Series computers).
The screen pictures show the BBC Micro version of the game.

THE CHARACTER EDITOR

PRIZE COMPETITION

If you complete all 40 screens of Around The World, you can enter our competition. Prizes include £200 in cash, with Repton mugs, badges, pens and certificates for runners-up. Closing Date: 31st January, 1988.

FREE REPTON BADGE WITH EVERY GAME SOLD

A colourful Repton badge is included free with every cassette or disc of Around The World in 40 Screens.

SUPERIOR SOFTWARE Limited

ACORNSOFT

Please make all cheques payable to "Superior Software Ltd".

Dept. A2, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: 0532 459453.

24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

CRAZEE RIDER

FREE:
ENHANCED BBC MASTER VERSION
- Extra Race Circuits
- Haunting Music
- Extra Graphics
- Auto-Demo Mode
- Extra Game Features

A PROGRAMMING BREAKTHROUGH
The first Electron motor racing game to faithfully represent the bends and chicanes of major international racetracks.

Setting the Scene

Going round the bend at Misano (BBC MICRO VERSION)

Knocking off an opposing rider (BBC MICRO VERSION)

Clever Electron progamming techniques (ACORN ELECTRON VERSION)

If you can't beat them, knock them off!

Howling round the bends at Le Mans at 150 m.p.h. is a daunting experience. You'll need nerves of steel and slick reflexes to finish in the Top 6 and qualify for the next race. If, at first, you can't make the grade you can always let off steam (and gain bonus points) by bumping into the other riders and knocking them off their bikes; listen for the terrified wail as the rider is sent flying to the ground.

Each race has 60 participants — and the further you get, the tougher the competition becomes. Bonus points are awarded for a good finishing position, and your "hit-count" shown at the top of the screen records the number of other riders you have sent tumbling from their steeds.

Seven top international racetracks are featured:-

- Le Mans (France)
- Anderstorp (Sweden)
- Paul Ricard (France)
- Brands Hatch (U.K.)
- Misano (Italy)
- Silverstone (U.K.)
- Nurburgring (W. Germany)

An enhanced version has been specially produced for owners of the BBC Master Series computers. Included free with all BBC Micro cassettes and discs, this version features several extra race circuits, a beautiful 6-minute musical soundtrack, and a host of extra game features — making full use of the Master's extra memory and capabilities.

BBC Micro Cassette..... **£9.95** Acorn Electron Cassette... **£9.95**
BBC Micro 5¼" Disc ..... **£11.95** Acorn Electron 3½" Disc. **£14.95**
BBC Master Compact 3½" Disc **£14.95**

(Compatible with the BBC B, B+ and Master Series computers).

PRIZE COMPETITION

A superb MZ Simson sports moped (illustrated above) worth £500 is the first prize in our competition.

To enter the competition, you must finish in qualifying position on the first 21 racetracks, and note down the congratulatory messages you receive.

Closing Date: 31st March, 1988.

SUPERIOR SOFTWARE Limited

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Access VISA

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OUR GUARANTEE
- All mail orders are despatched within 24 hours by first-class post.
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